21/12

LIBRARY, OFFICE OF PUBLIC ROADS AND RURAL ENGINEERING

OCT 14 '18

Rock Products

$2.00 A YEAR | CHICAGO | OCTOBER 9, 1918

Here's Your Catalog of SAND and GRAVEL GATES

A REQUEST brings it to you by return mail. It contains the information (illustrated) you need concerning gates that can be used **advantageously** in **your** plant. You have some idea concerning gates for governing the discharge of sand and gravel, crushed stone, limestone, etc.—**now get our ideas,** whether you need them immediately or not—place them on file. Here's the new catalogue. **Ask.**

BEAUMONT MFG. CO.

434 Chestnut St., Philadelphia, Pa.

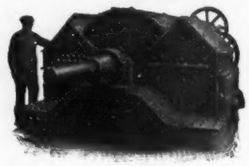
Keystone Kilns

Whatever the fuel you can most economically use—there is a Keystone model adapted to it. That particular model will give as satisfactory results as can possibly be achieved. Our engineers—men who have had actual experience in burning lime, as well as in the designing and building of Kilns—are ready to work out your problem. For a start-off, ask for the new, revised Keystone catalogue. It will convince you of Keystone Kiln worth. We respectfully suggest that you *WRITE TODAY.*

233 Kilns in use to date

STEACY - SCHMIDT MFG. CO.
YORK, PENNA.

"PENNSYLVANIA" Hammer Crushers



PATENTED

For Crushing and Pulverizing Lime, Limestone, Gypsum, Marl, Shale, Etc. Main Frame of Steel, "Ball and Socket" Self Aligning Bearings; forged Steel Shaft; Steel Wear Liners; Cage adjustable by hand wheel while Crusher is running. No other hammer Crusher has such a big Safety Factor.

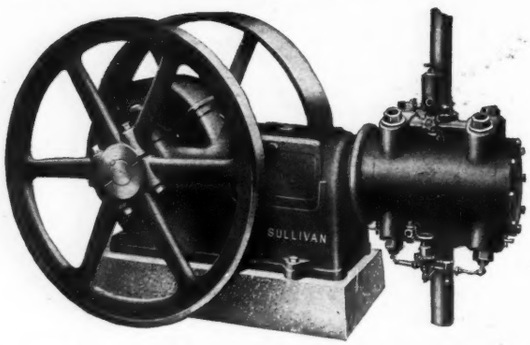
PENNSYLVANIA CRUSHER COMPANY
New York PHILADELPHIA Pittsburg

F. L. SMIDTH & CO.

50 CHURCH STREET NEW YORK

Engineers

CEMENT MANUFACTURING PLANTS
CEMENT MAKING MACHINERY
PULVERIZED COAL INSTALLATIONS
GRANULATING AND PULVERIZING MACHINES FOR ALL MATERIALS
FLINT PEBBLES—SILEX LINING
THE LENIX BELT DRIVE



SULLIVAN Small Air Compressors

ARE RELIABLE, EFFICIENT AND COST LITTLE FOR UPKEEP

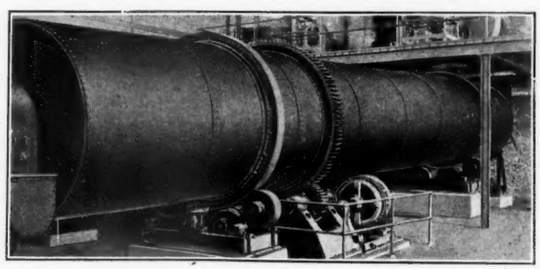
In buying small air compressors—you want—not a "cheap" machine, but one that you can depend on to run right and to run all the time—with greatest efficiency, with least power and attendance. These qualities result in real economy. They are found to an unusual degree in Sullivan "WG-3" belted machines.

In stock, 50 to 300 cu. ft. capacity
Bulletin 3675N

SULLIVAN MACHINERY COMPANY
82 E. Adams St., Chicago

RUGGLES-COLES DRYERS

for coal, clays, sand, stone, etc. They will burn less fuel than any other type and with their low power and repair costs are most economical to operate.



BUILT TO DRY AT THE LOWEST ULTIMATE COST

RUGGLES-COLES ENGINEERING CO.
McCORMICK BLDG. 50 CHURCH ST.
CHICAGO WORKS, YORK, PA. NEW YORK

Saying "I saw it in ROCK PRODUCTS" will bring quick action.

Rock Products

TRADEPRESS PUBLISHING CORPORATION
538 SOUTH CLARK STREET
CHICAGO

NATHAN C. ROCKWOOD
Editor

T. BIRCHLER
Assistant Editor

GEO. P. MILLER
Manager

RICHARD S. DARLING
Eastern Representative

SUBSCRIPTION

$2 a year in United States; $3 a year, Canada and foreign. Single copies, 20 cents. Date on wrappers indicates issue with which your subscription expires. In writing to have address changed, give old as well as new address.

Entered as second class matter July 2, 1907, at the Postoffice at Chicago, under act of March 3, 1879.

PUBLISHED EVERY OTHER WEDNESDAY

by the Tradepress Publishing Corporation, 538 South Clark St., Chicago, Ill., U. S. A. W. D. Callender, president; T. J. Sullivan, vice-president; Fred D. Porter, Secretary; George P. Miller, Treasurer.

Table *of* Contents

Vol. XXI, No. 12 *October 9, 1918*

Editorial—Shall There Be a Joint Convention? 15-17
Lime Manufacturers Must Make Pledges 18
Work of the War Service Committee on Mineral Aggregate 19-20
Does Uncle Sam Need Sand? 21-22
Many Uses of Crushed Stone 22
Unloading a Sand Boat by Hydraulic Means Successfully and Profitably 23-25
General News 26
Track System of the Buffalo Crushed Stone Co 27-29
Lime Fertile 30
Phosphate Rock in the United States 31-33
Limestone Producers as Fertilizer Manufacturers 34
Indiana Portland Cement Co. Plant 35-37
Quebec Issues 1917 Report 38
Building Industries and War Work 39
New Machinery 40
Wholesale Prices, Crushed Stone, Sand and Gravel 41-42
Markets and News 43
Passed by the Screen 44-45

ALPHABETICAL LIST OF ADVERTISERS

Aero Pulverizer Co. 47
Allis-Chalmers Mfg. Co. 62
Alexander Milburn Co., The 58
Alpha Portland Cement Co. 8
American Pulverizer Co. 54
American Steel & Wire Co. 48
Atlas Car & Mfg. Co. 52
Atlas Powder Co. 4
Audubon Wire Cloth Co. 48
Austin Mfg. Co. 52
Bacon, Earle C., Inc. 48
Ball Engine Co. 53
Bausch & Lomb Optical Co. 50
Beaumont, R. H., Co. 1
Bradley Pulverizer Co. 59
Butterworth & Lowe 51
Byers Machine Co., John F. 53
Carolina Portland Cement Co. 47
Chattanooga Paint Co. 47
Chicago Perforating Co. 50
Classified Advertising 45
Dull Co., Raymond W. 59
Dunning & Boschert 48
Du Pont de Nemours & Co., E. I. 61
Ensign-Bickford Co. 61
Erie Pump & Engine Works 58
Erie Steam Shovel Co. 51
Fate, J. D., Co. 55
Fuller Engineering Co. 47
Gifford-Wood Co. 51
Gruendler Pat. Crusher & Pulv. Co. 48
Hendrick Mfg. Co. 51
Huron & Wyandotte Portland Cement Co. 47
Jaite Co., The 47
Jeffrey Mfg. Co., The 56
Johnston & Chapman 51
K-B Pulverizer Co., Inc. 53
Kent Mill Co. 54
Kissel Motor Car Co. 60
Kritzer Co. 49
Leschen, A., & Sons Rope Co. 63
Lewistown Fdy. & Mach. Co. 48
Locomotive Pulv. Fuel Co. 50
McLanahan-Stone Machine Co. 48
Miscampbell, H. 49
Nortmann-Duffke Foundry Co. 50
Osgood Co., The 49
Pennsylvania Crusher Co. 2
Pierce-Arrow Motor Co. 10-11
Raymond Bros. Impact Pulv. Co. 57
Ruggles Coles Eng. Co. 2
Sanderson Cyclone Drill Co. 63
Schaffer Eng. & Equip. Co. 62
Scioto Lime & Stone Co. 49
Smidth, F. L., & Co. 2
Steacy-Schmidt Mfg. Co. 2
Stephens-Adamson Mfg. Co. 56
Sterling Motor Co. 12
Stroh Steel Hardening Process Co. 63
Sturtevant Mill Co. 6-7
Sullivan Machy. Co. 2
Traylor Eng. & Mfg. Co. 9
Tyler Co., The, W. S. 55
Universal Crusher Co. 52
Used Equipment 46
Vulcan Iron Works 50
Watt Mining Car Wheel Co. 5
Webb City & Carterville Foundry & Mach. Works 52
Webster Mfg. Co. 13
Weller Mfg. Co. 51
Williams, C. K., & Co. 47
Williams Patent Crusher Co. 53
Woodville Lime Prod. Co. 64
Worthington Pump & Mach. Co. 57

For More Efficient and Economical Blasting

Our service men have solved thousands of blasting problems, each presenting extraordinary difficulties. Their work has meant better and cheaper results in all sorts of blasting, from slicing off the side of a mountain to making a ditch. ATLAS service works all the time—in quarries, coal mines, ore mines, road and railway construction, tunneling, submarine blasting—anywhere.

A Century's Experience

We have the benefit of more than a century of experience in making explosives. This experience we place at the disposal of every man who has to do with blasting. This service is given without reserve—there are no strings on it. It is service by experts backed by the entire ATLAS organization.

No job is too large, too small or too remote to merit and get the most intimate study and careful personal attention of ATLAS experts.

"Put your blasting problems up to ATLAS" is our standing invitation. It is also the often repeated advice of ATLAS customers to friends who have never tested ATLAS services.

Tests Guarantee Every Pound

There is a proper ATLAS explosive for each blasting requirement. Our own complete chemical laboratory makes tests which guarantee every pound. Each type and grade of ATLAS explosives must be absolutely uniform month in and month out, year after year. Similar blasting results under similar conditions can be depended on always. Rigid ATLAS tests assure continuous satisfaction.

The result of this assurance of uniform quality and our zeal for thorough-going personal service to our customers is thus described by one of our customer-friends: "You are more than mere makers of explosives, you are guarantors of better blasting results at lower blasting cost."

ATLAS POWDER COMPANY

Home Office: Wilmington, Del.

Sales Offices: Allentown (Pa.), Birmingham (Ala.) B oston, Chicago, Des Moines, Houghton (Mich.), Joplin (Mo.), Kansas City, Knoxville, McAlester (Okla.), M emphis, Nashville, New Orleans, New York, Philadelphia, Pittsburg (Kan.), Pittsburgh (Pa.), Po ttsville (Pa.), St. Louis, Wilkes-Barre (Pa.).

Put your blasting problems up to us

Our Service Department is a clearing house of blasting experience in all its phases and under all conditions. It is directed by experts who will personally help you apply this vast store of information to *your own blasting*. WRITE TODAY.

A PROPER EXPLOSIVE FOR EVERY BLASTING REQUIREMENT

Cooperation is the thing—please mention ROCK PRODUCTS.

Here's the Earth and WATT hauls It

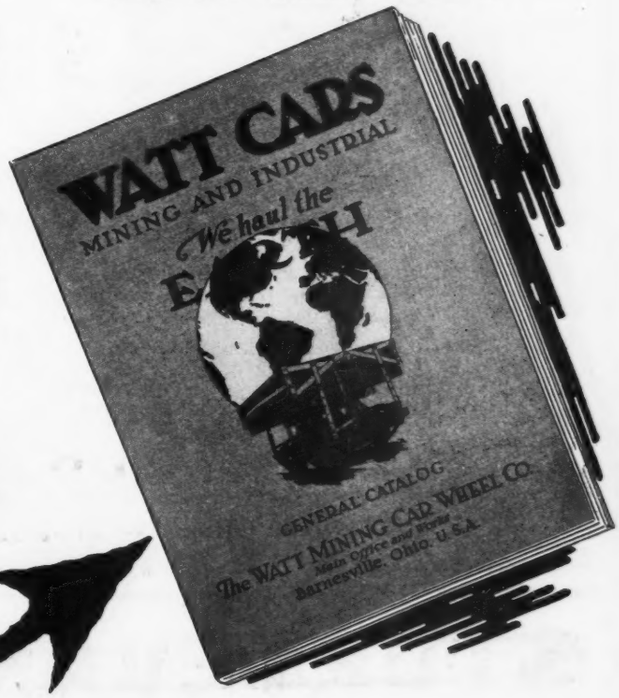
Send for this Catalog

IT tells you about WATT CARS and shows, probably, the **exact type** that you need in **your** plant.

UNDERSTAND: Watt cars are designed for endurance, and with the view of economy in time and repairs.

HOWEVER: Ask for this catalogue—tell us your particular needs and our engineers will point out the type best adapted for your use and will suggest how **we** can help you economize. Copy on request.

Just Issued
it tells HOW and WHY



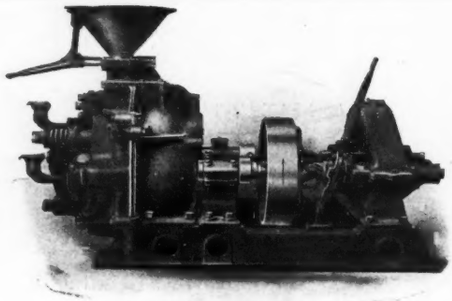
THE WATT MINING CAR WHEEL COMPANY
BARNESVILLE, OHIO

DENVER OFFICE
Lindrooth Shubart & Co.
Boston Bldg.

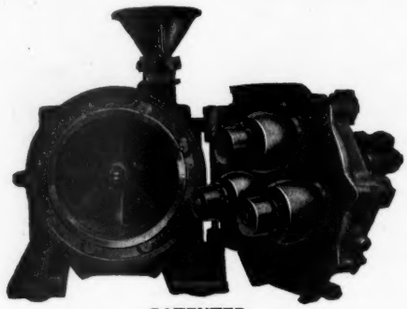
SAN FRANCISCO OFFICE
N. D. Phelps
Sheldon Bldg.

Saying "I saw it in ROCK PRODUCTS" will bring quick action.

STURTEVANT



PATENTED



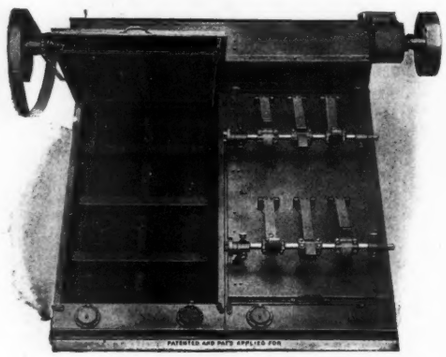
PATENTED

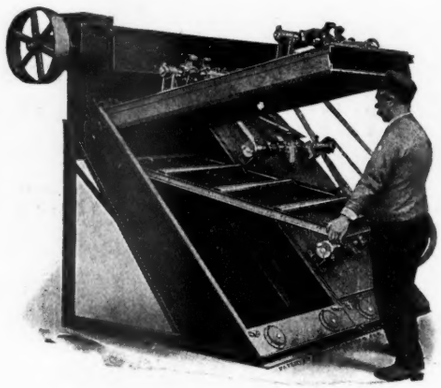
RING-ROLL MILLS

The most durable and efficient grinder for hard and moderately hard rock or ore. Used for the reduction of Cement-Clinker, Limestone, Quartz, Ores, Granite, Trap, Phosphate, Coal, etc., etc. Hundreds in use. RANGE OF OUTPUT 8—100 MESH.

Construction—"Open Door" accessibility, every part within quick and easy reach. Nothing to get out of order or give trouble. Small power, slow wear. Built in single and Duplex Designs—compact and convenient, steady runners. BUILT IN FIVE SIZES.

Action—Material passes through hopper and is delivered on inner surface of concave, revolving ring, where it is held by centrifugal force. Three convex Rolls are strongly pressed against this centrifugally held layer of material and revolve by friction against it. The Rolls thus roll over the material, first crushing it and then wedging it off of both sides of the ring.





NEWAYGO SUPER-SCREEN

Unit Construction—Each unit has screens 6 feet by 3 feet and is a complete Separator in itself. Each part is interchangeable and of the most efficient size for vibrating, capacity, handling, repair, etc. By simply bolting units together a Separator of any reasonable capacity may be obtained.

The Vibration is truly wonderful and yet nothing comes in contact with the fine wire cloth, except the material being screened. Hammers jar elastic bridges far above the screen cloth, which transforms these shocks into high-pitched vibrations, when transferred to the wire cloth. The scalper is also vibrated.

Screen Cloth Tensioning—The screen cloth is stretched taut and held taut, and the tension may be regulated locally or in its entirety.

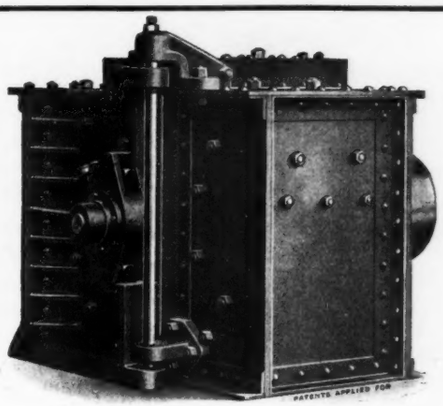
One Finger lifts the cover, and exposes the "Scalper" and Fine Screen. The "Scalper" slides into and is pulled out of the cover, like a drawer. The fine screen rests in the screen box, and is unobstructed by any mechanism, and is removed by simply lifting it out.

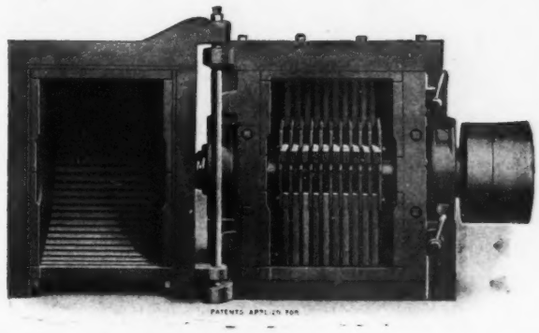
Accessibility, such as this, has heretofore been unknown.

STURTEVANT MILL CO.

For better service say "I saw it in ROCK PRODUCTS."

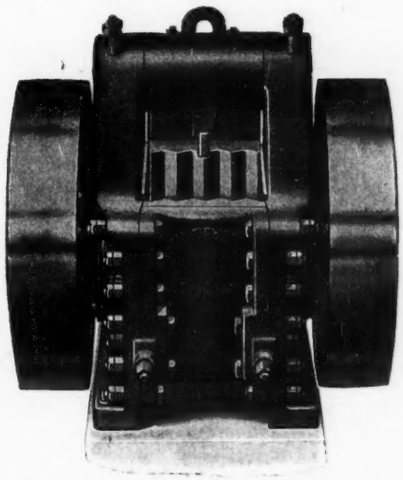
STURTEVANT





OPEN-DOOR PULVERIZERS

One man in one minute can get at every part for cleaning, adjustment, repair or for the removal of iron. Shutting down a plant is costly—accessible machinery minimizes delay. It requires minutes instead of hours to get at any trouble with Sturtevant "Open Door" Machinery. Continuous operation means economy, large production, profits and small operating costs. Labor is scarce and of poor quality—most of it is eliminated by machinery, which seldom requires attention, and when repairs must be made, a simple and accessible machine pays for itself many times over.



JAW CRUSHERS

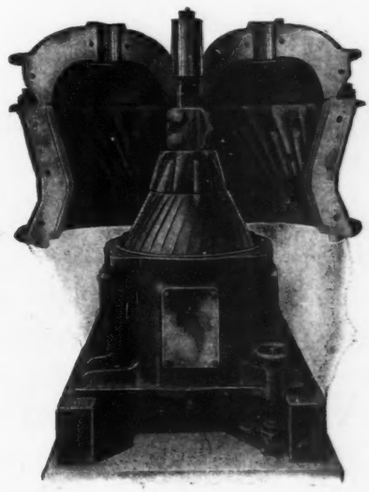
Action—Double Cam and Roll giving jaws two nips to each revolution of flywheels. Run at half the speed of others for same output. Slow speed means no hot boxes or bearing troubles and smooth, steady running—cheap foundations—long life.

Range of Output—6" to ½".

Uses—For crushing anything crushable, that is friable.

Jaw Sizes—2"x6", 4"x8", 5"x10", 8"x10", 6"x15", 10"x15", 6"x20", 12"x26".

Types—Coarse Crushers—Output: 2" to 6".
Intermediate Crushers—Output: 1" to 1½".
Fine Crushers—Output: ½" to 1".



ROTARY CRUSHERS

WITH OPEN-DOOR ACCESSIBILITY

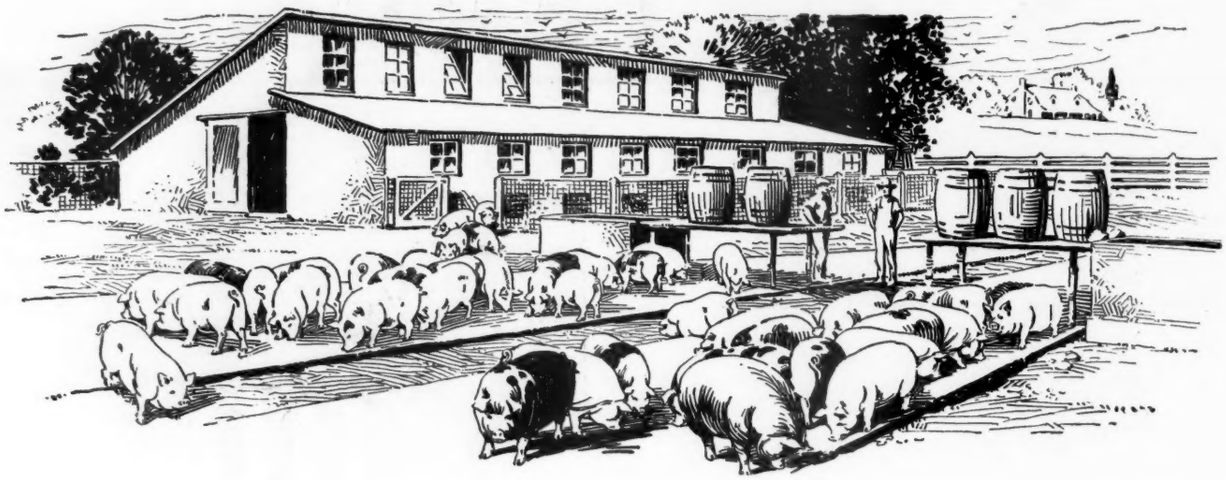
Uses—For crushing large pieces of soft and moderately hard materials to 1" or to corn size and smaller. A most popular and widely used machine. Used largely as a preparatory crusher for Pulverizers.

Some of the materials being crushed in Rotary Crushers—Lime, Gypsum, Talc, Phosphate, Shale, Clay, Fullers Earth, Coke, Carbon, Chalk, Coal, Cement-Clinker, Sulphur, Caustic, Chemicals, Bauxite, Barytes, Oyster and Clam Shells, Colors, Facings, Brick, Salt, Soapstone, etc.

Sizes—Five. **Capacities**—½ to 20 tons per hour.

HARRISON SQ., BOSTON

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry.



Turning Garbage Pails into Boxes of Bacon

The September number of ALPHA AIDS, a publication issued by us regularly in the interests of engineers, architects, contractors, building material dealers and others interested in concrete construction, gives a summary of what several enterprising municipalities are doing just now in turning the town garbage into a larger supply of the bacon that Uncle Sam needs. Our city of Easton has purchased a farm for this purpose, after looking into the experience of Worcester, Mass., and other municipalities.

ALPHA AIDS tells also how to build a number of different types of hog houses and yards. Some are entirely concrete; others are not. The descriptions are freely illustrated with photographs and working drawings.

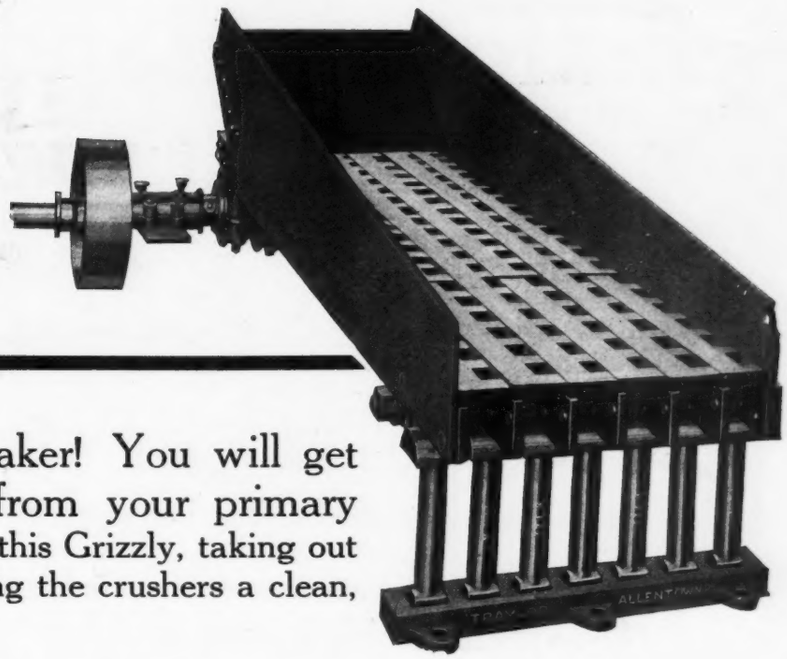
If your own community has not started turning garbage pails into boxes of bacon, be the man to head this timely movement. Full information gladly sent, free of all obligation.

ALPHA PORTLAND CEMENT COMPANY

EASTON, PA.

Branch Offices: New York, Boston, Philadelphia, Pittsburgh, Baltimore, Savannah

You will get entire satisfaction if you mention ROCK PRODUCTS.



IT is some shaker! You will get best results from your primary crushers by using this Grizzly, taking out the fines and giving the crushers a clean, even feed.

Installed as a scalping screen, it increases the capacity of your present screening plant and enables it to do better work. The

SHERIDAN SHAKING GRIZZLY

is patented. It is simple, efficent and economical.

This Grizzly has a very large capacity and its work is unsurpassed by any coarse screening device on the market.

At the same time it requires minimum headroom, little horsepower per ton of material screened and practically no attention.

We publish a special booklet concerning the Sheridan Shaking Grizzly and will be glad to send it on request, posting you on the best rough screening and feeding device made.

TRAYLOR ENGINEERING & MFG. CO.

NEW YORK
CHICAGO

Main Office and Works
ALLENTOWN, PA.

LOS ANGELES
SPOKANE

The advertiser wants to know that you saw his ad in ROCK PRODUCTS.

Applies four tests and chooses Pierce-Arrows

J. A. Mercier has made a thorough test of trucks and has replaced his horse equipment with a fleet of Pierce-Arrows. To his own satisfaction he has demonstrated their superiority on four grounds:

Reliability, durability, longevity;
Economy of upkeep and maintenance;
Unequalled efficiency; and
Business-building value.

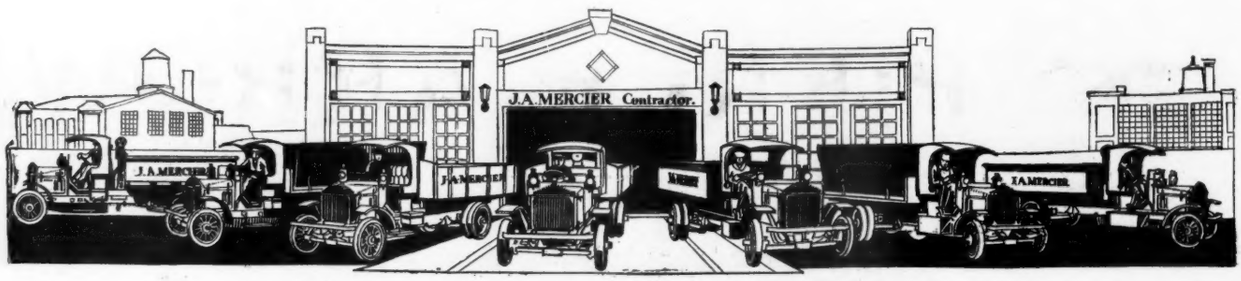
J. A. Mercier installed his first Pierce-Arrow nearly seven years ago, on November 8th, 1911. He tried it out for two years and, at the end of that time, found that its maintenance and upkeep cost was so low in proportion to work done that it compelled him to abandon his horse equipment and install motor trucks.

Each year since he has added to his fleet until he now operates eleven Pierce-Arrows.

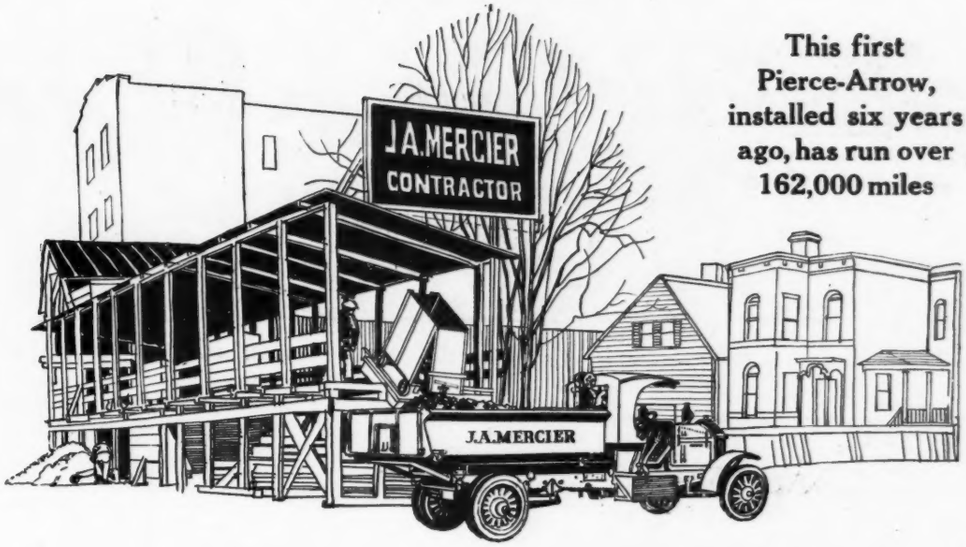
On the sixth anniversary of its service, this first truck had run 162,000 miles. Three trucks bought in 1914 had averaged 65,000 miles. Two bought in 1915 had run over 35,000 miles. One added in 1916 had run 38,000 miles and two installed in 1917 were along toward 5,000 miles. Two were added this year.

In the progressive development of this fleet building, these trucks have been in constant service and have unfailingly made good.

In comparison with other trucks they show a minimum of lost time and a greater carrying capacity; they will handle an aggregate load in less time than any other means of hauling.



It gets immediate attention if you mention ROCK PRODUCTS.



This first Pierce-Arrow, installed six years ago, has run over 162,000 miles

The Mercier fleet has been used for all sorts of contracting work. It has hauled rock, sand and other material on many of the major building operations in Detroit. During the past year it has done some very notable work in sewer tunnelling on which the Mercier Company has been engaged.

Last winter five of the trucks worked hauling coal from the railroad pockets to the Detroit Edison Company's generating plants. Throughout the winter months these five trucks delivered 1100 tons of coal a day. No matter how big the snow-drifts or how severe the cold, they operated with minimum delays and never once failed to deliver their daily quota.

The unfailing reliability of the trucks has been a very important factor in their service. Delays mean so much in the contracting business, entailing penalties and sacrificing bonuses, that this reliability would commend the trucks were their cost of operation more expensive than other haulage. When they actually save money in operating costs and maintenance, they become big factors in building up business.

This Mercier experience is not unique but is characteristic of Pierce-Arrow performance in the contracting business.

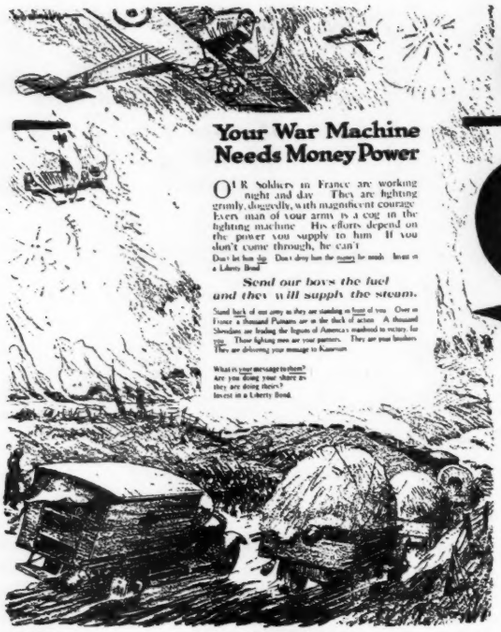
THE PIERCE-ARROW MOTOR CAR COMPANY

BUFFALO, N. Y.

PIERCE-ARROW

Motor Trucks

Prompt attention will be given your inquiry if you mention ROCK PRODUCTS.



Sterling Motor Trucks

Applies Also to Rock Products

By Floyd W. Parsons, Editor of The Coal Age, in the Saturday Evening Post, April 6, 1918.

Cheap Deliveries by Motor.

Fuel conservation is interesting, but we cannot do much in the way of saving unless we first get the coal into our bins. During the past winter most every city has been taught a lesson showing the need of emergency storage yards. Hundreds of communities will take steps to insure against local fuel famines next winter. New York City, with its millions of people, narrowly averted disaster from freezing, while at the same moment nearly 400,000 tons of coal were lying across the Hudson River in New Jersey terminals waiting to be moved. There was hardly a city that did not present its spectacle of icy streets with horse-drawn coal wagons stalled on every block. This is an age of motor vehicles and not a time to employ horses to haul coal through snowdrifts. If we do not provide against a repetition of last winter's coal-delivery experiences we shall be deserving of all the hardships we shall have to endure.

It is worth noting in this connection that one of the largest Government departments in Washington decided to investigate the problem of local coal delivery. Trucks were purchased and a coal yard was rented. The lowest bid price for delivery of the required coal tonnage was $1.46 per ton. The department's complete figures from August 16, 1917, to February 1, this year, show a delivery cost of approximately $.74 per ton. The total saving on 7216 tons delivered was $5174. It is likely all Government departments in Washington will follow suit. Coal delivery may not be such a problem after all.

Read These Heavy Hauling Economy Facts

HIGH authority and proved experience at the Nation's capital will interest you.

—Only 74 cents per ton for coal delivery costs.

—Consider Sterling Motor Trucks for your work on long or short hauls.

The Sterling exclusive wood-inlaid frame eliminates vibration.

We cushion Sterling frames with wood. Bolts, not rivets, are firmly anchored in this shock-absorbing cushion. The result is — absorbed vibration which assures longer life, less maintenance and inspection expense, practically no "loose bolt" troubles.

STERLING DUMP TRUCKS are designed and constructed especially for any trade.

Better engineering, better materials and better workmanship have evolved a haulage unit giving strength without weight and capacity without burden.

SIMPLY, SCIENTIFICALLY BUILT — Simply constructed — several hundred parts usually found in motor truck construction have been omitted altogether in Sterling engineering. Built to resist the terrific road shocks and so easy to handle that it is safe in the hands of the ordinary driver.

2½, 3½, 5 and 7 TON CAPACITIES —Worm drive with the exception of the 7 ton size. For the farsighted business man seeking future hauling profits rather than initial cheapness, this better engineered, better constructed dump truck will answer all hauling requirements. Write for complete information.

Sterling TRUCKS

Sterling Motor Truck Co.

Builders of Motor Trucks Exclusively for Eleven Years

MILWAUKEE, WIS., U. S. A.

Distributors in leading cities

WEBSTER

Machinery for Conveying, Elevating, Screening, Washing, Storage and Power Transmission

Your Needs— Our First Consideration

There are many operations that would not justify the extensive machinery we have installed for the plant pictured below.

And there are operations that would call for lay-outs even more elaborate.

Whatever the conditions require that is what our engineering force suggests.

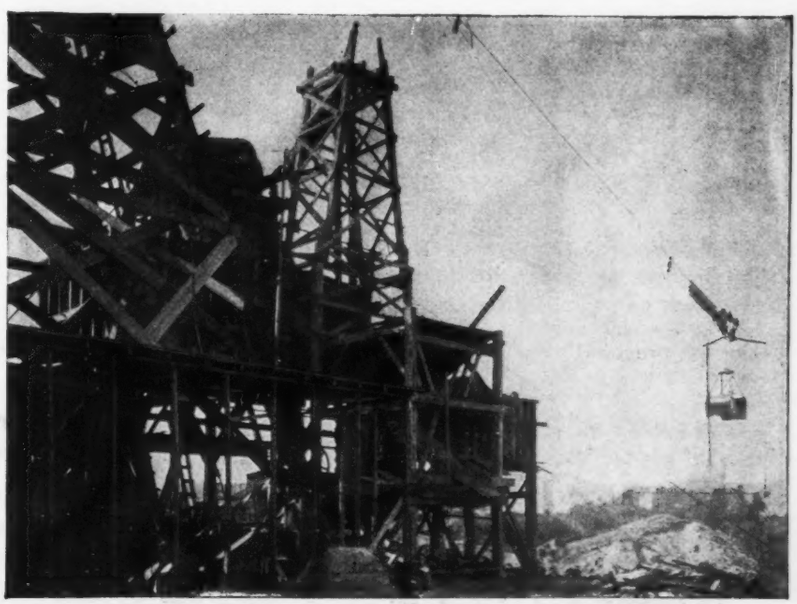
Webster engineers stick close to that fine business policy which says that every transaction must be highly beneficial to the customer.

A Webster engineering recommendation can be relied upon to work out and pay out for the user.

Nice business principles go hand in hand with a quality product.

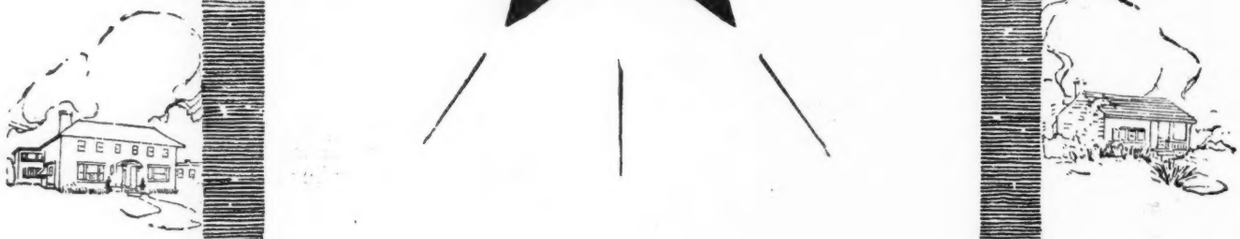
Webster machinery is as dependable as Webster methods—Webster methods are as dependable as Webster machinery.

State your problems and get Webster suggestions.



The Webster Mfg. Company
Tiffin, Ohio
Chicago **New York**

(244)



The service flag! with its star of blue; sometimes turned gold: silently it sells more bonds than any salesman in the land. ☆ It matters little where this badge of service hangs: in the home of wealth or in some humble cottage. ☆ Always its message is the same: that you shall lend—and generously lend to end this war more quickly. ☆ To save more stars of blue from turning gold. ☆ ☆

4th LIBERTY LOAN

U. S. Government Bonds

This Space Contributed to the Winning of the War by ROCK PRODUCTS

Rock Products

Vol. XXI Chicago, October 9, 1918 No. 12

Shall There Be a Joint Convention of the Stone and Gravel Industries?

Prominent Producers of Both Gravel and Crushed Stone Express Opinions on a Get-Together Meeting Next Winter

SOME WEEKS AGO the editor of ROCK PRODUCTS asked prominent producers of "mineral aggregates" to express opinions for or against a joint convention of the National Sand and Gravel Producers' Association and the National Crushed Stone Association.

Attention was called to the two meetings held in Chicago last February on the same days, but at different hotels. At that time the feeling between the two associations appeared to be rather antagonistic than cordial. Since then many things have happened to bring the producers of both materials together. They have seen the light—in many cases—and find many problems of common interest.

All producers in the various districts of the War Service Committee on Mineral Aggregates will soon be *obliged to coöperate* to the fullest possible extent. Many problems will come up which will make excellent subjects for a national conference between the two industries.

Also they must lay plans for the future. Will the two industries coöperate and present a united effort for larger markets and better recognition, or will they go their separate ways and begin knocking campaigns—which can never result in but one end—lowering the public respect for both industries and using up energy which could better be spent in enlarging the field for both materials?

The specific suggestion was made to have each industry hold its own convention, but to have at least one joint session to discuss these matters of common interest—and a joint dinner (banquets in war times are not in good taste) to get acquainted socially and forget for a few hours at least all previous troubles and animosities.

This suggestion was made not with any intention of usurping the prerogatives of the officers and directors of the two National Associations to name the date and place of the conventions, but to get the point of view of some of the leading lights of the two industries on the subject of coöperation. When and where the conventions are to be held is, of course, a matter for the directors to decide, but wherever the conventions are held, why not provide the means for mutual understanding and coöperation? Here are some of the answers:

S. A. Fones, Independent Gravel Co., Joplin, Mo., writes:

"Naturally we would be delighted to see as great a consolidation of the organizations as possible, for our business includes both. It probably is not practical to combine the organizations, but they may all rest assured that there will be business for all when the war is over and any surplus energy they may have should be used to better advantage than scrapping among the gravel and stone people. A closing banquet for the two organizations should tend to dispel any animosities they may have."

R. W. Scherer, Secretary, Wisconsin Crushed Stone Association, writes:

"Your efforts to get together and harmonize the two industries which ROCK PRODUCTS is so ably serving, do you great credit. Association or even banquetting together must have a solid basis of common interests and there are many points in common between crushed stone and sand and gravel.

"As you suggest there are War Service Committee work, shipping problems, labor and fuel, etc. While coöperation between the two industries on these points has been assured by their compulsory grouping under the same committee men by the War Industries Board, a joint meeting in February, about the time when the plans for coöperation would be formulated or announced, might help a great deal towards better mutual understanding.

"Then, we are interested equally with the gravel producers in road boosting. While the Highway Industries Association takes care of this feature, these two industries have peculiar problems of their own in highway work in which concerted action would certainly be of benefit to both.

"Of course, producers of gravel and crushed stone can be assumed to differ on the question of the merits of their product. The question needs to be discussed for the good of concrete and for the good of good roads. To ascertain

the truth and make known the truth about their products, is a duty which all manufacturers owe to the users of those products.

"There is no need to cease arguing the comparative merits in certain fields of crushed stone and gravel. But even here a joint meeting would tend to keep animosity out of the argument, so that it can be conducted, as I can assure you it has always been conducted in Wisconsin, in the spirit of fairness."

J. R. Sensibar, President, Construction Materials Co., Chicago, writes:

"While I was in Washington at the conference with Mr. Humphrey, some of the boys suggested having the meeting in New Orleans in January or February. It was thought that by announcing the date and location of the meeting far enough in advance, some of the producers would take advantage of the trip and combine it with a vacation. This did not seem to be a bad idea, and am rather inclined to favor the thought myself.

"There certainly could be no objection to have the sand and gravel men coöperate with the stone people in the matter of date and location for the convention, etc.

"The get-together meeting at Washington, between the gravel and stone people, certainly demonstrated that no harm will come to either side by coöperating to some extent at least."

John Wunder, Treasurer and General Manager, Trap Rock Co., Minneapolis, Minn., writes:

"I think that your idea of a joint affair and convention date is an excellent thing for all concerned.

"Especially in these times I feel that in order to accomplish what each and separate association is aiming for, at the present time with the Government control, could be accomplished with better results as one large body."

Guy C. Baker, Secretary, Ohio Sand and Gravel Producers Association, writes:

"I believe that greater interest would be aroused by members in both associations, were the two conventions to be held as you indicate. I can see no reason why the two conventions should not be so held. The questions considered by the annual National Convention are for the most part the big issues which would be of interest to both associations. In addition to this there could be had unity of consideration as well as unity of action in relation to War Service Committee work, which would carry greater weight than action taken by either association alone."

John Prince, Prince-Johnson Limestone Co., Kansas City, Mo., writes:

"I certainly think it would be desirable to have a joint session of the National Crushed Stone Association and the National Sand and Gravel Producers' Association, if they hold their conventions this winter. My trip to Washington was as a representative of both the sand and crushed stone interests, being associated here with the Stewart Sand Co. as well as with the Prince-Johnston Limestone Co.

"In this district there is no conflict between these two branches, as there is practically no production of gravel in competition with crushed rock. I attended the meetings of both the crushed stone and gravel men, and I was impressed that it was highly desirable for these two industries to get together. I believe the differences of opinion between the two industries and the apparent competition has been in a large part the cause of the disorganized condition of these industries.

"In insisting that these two industries form a joint committee, Mr. Humphrey gave expression to the hope and belief that in so uniting in their efforts the ground work would be started for a union of the two industries to their future benefit. He said he believed no industries in the country had suffered more from their selfish competitive efforts than had the sand, gravel and crushed stone industries. As Mr. Humphrey is urging, and in fact practically demanding the pooling of these industries, it seems to me a splendid opportunity to bring about a close relation between them. The past competition between the two industries has been just as disastrous as has been the unnecessary competition between individuals. It seems as though a change were coming in that direction, and I hope the industries will take advantage of it in full measure."

T. E. McGrath, Secretary, McGrath Sand & Gravel Co., Lincoln, Ill., writes:

"I believe such a meeting would bring about a co-operative spirit between the two industries, and upon becoming acquainted with each other we should find that there is no reason for the animosities that now exist.

"There is no reason why the two industries cannot work harmoniously together. I am for such a meeting and shall boost it along."

A. J. Sullivan, Vice-President, U. S. Crushed Stone Co., Chicago, Ill., writes:

"I think your suggestion with reference to a "get-together" meeting between the crushed stone and gravel producers at the conventions is timely. I think nothing but good could come from such a meeting, and I wish to assure you of my hearty support of this move on your part."

E. Guy Sutton, Secretary, War Service Committee on Mineral Aggregates, writes:

"Since the two industries have been united for the formation of a War Service Committee, in my opinion it would be very desirable to have a general conference of the interests involved. I believe it would not only be helpful in carrying out the plans and work of the Committee, but might also result in bringing about a finer spirit of coöperation than has apparently existed between the two industries in the past."

Allen Patterson, Secretary and Treasurer, Bluffton-Lewiston Stone Co., Lima, Ohio, writes:

"I would consider it a good proposition all the way through and especially the joint session. I am quite sure that the discussions at that meeting would be beneficial to everyone. Personally I would endorse this proposition."

Jno. S. Porter, Secretary and Manager, Huron Shore Gravel Co., Saginaw, Mich., writes:

"I can see no reason why the sand and gravel men and the crushed stone men should not sit down at a banquet together and feel that their activities were not antagonistic.

"These are the times when men should see things clearly and there is nothing to be gained in commercial warfare, but very much is to be gained in honest coöperation.

"The materials produced by the two lines of business can be sometimes used interchangeably, but there should be a greater effort made to extend their use rather than trying to supplant one material with the other.

"Social acquaintance invariably promotes mutual understanding and respect and I am in favor of the plan you outline."

Robin Boyle, Provincial Stone & Supply Co., Ltd., Toronto, Can., writes:

I am quite in accord with your suggestion to join with the gravel men in discussing matters of common interest. This opinion is entirely personal, but I believe that it will receive the endorsement of the stone men in our district.

F. W. Bilger, President, Oakland Paving Co., Oakland, Calif., writes:

"Your suggestion about holding the convention of sand and gravel and crushed stone producers appeals to me very much. The antagonism between the sand and gravel producers and the crushed stone men evidently must be eliminated to some extent, and I see no better way to accomplish this than meeting at separate conventions and thereafter at some sort of a joint convention. At this joint convention all matters of common interest could be discussed.

"By all means have a joint banquet. A well arranged function of that sort will get together at least the leading lights in the two industries and much good should result therefrom.

"With reference to the separate conventions, let me suggest that they be held at different hours, so that the gravel men can attend the crushed stone producers' convention, and vice versa."

W. L. Sporborg, President, Rock-Cut Stone Co., Syracuse, N. Y., writes:

"I am in favor of your proposition, that the stone men and the sand and gravel men hold their annual meetings at the same time and place, and arrange a joint session. Such a joint session should not be an impromptu affair, with the floor open to all. Our respective executive committees should communicate or get together and arrange a program of subjects, just as you suggest. I think each Association should appoint a committee to take up each of the subjects agreed upon, that the two committees on each subject should get in touch and prepare separate and joint reports, and the program and committee reports should be in the possession of the members, a reasonable length of time before the joint meeting. I think that the length of time for discussion of each topic should be arranged in advance. Papers might possibly be prepared by individual members on some topics, and that would be a good thing. I think there is usually little value in open discussion in a big meeting, and a great waste of time. As you say, there are many matters that are of interest to both of these industries, and for my part I am in favor of trying to find a way whereby we can all work together."

Parker M. Lewis, President, American Sand & Gravel Co., Chicago, writes:

"I can see nothing but good to come of a joint convention of the sand, gravel and stone interests particularly after our experiences at Washington recently when the entire industry organized a War Service Committee under the War Industries Board.

"There are many problems in which the different industries are equally interested, and moreover association together is always productive of good.

"Our experience in organizing the War Service Committee at Washington when those who attended were brought into direct contact with official Washington, and the benefit that each of us received through that official contact, leads me to believe that Washington is the proper place to hold such a convention at this time. The mind was broadened and everyone of us was more thoroughly impressed with the necessity of coöperating with the government in every possible way to help win the war. We were shown that what seemed to us apparent trifles, when multiplied, become important essentials in the winning of this mighty struggle.

"Unless some very excellent reason is offered in favor of some other place, let it be Washington."

Many more hearty endorsements of the proposed joint meeting were received, and also, in all fairness, there were one or two prominent producers of each material who opposed such a step. Nevertheless it is confidently believed that the letters quoted are typical expressions of the attitude of the progressive leaders of both industries and prove that Rock Products is justified in proposing harmony and good will.

Buy Liberty Bonds Buy Liberty Bonds Buy Liberty Bonds

Long Awaited Decision on Freight Rates on Sand, Gravel and Crushed Stone

DIRECTOR GENERAL McADOO authorizes the following: The Railroad Administration has given very careful and thorough consideration to applications from shippers of sand, gravel and crushed stone to modify the increase in freight rates brought about by General Order No. 28, by substituting some other basis for the uniform advance of one cent per 100 lbs. provided in the order.

The conclusion has been reached that no other general basis can consistently be applied, but that in line with the announcement made by the Director General at the time of the General Order No. 28 was issued, consideration will be immediately given to all individual cases where increases under the general order have brought about unnecessary hardships or excessive rates, under existing conditions.

It is expected that the shippers who feel that the increased rates brought about by General Order No. 28 are excessive in specific instances will present applications for modification of such rates on these commodities to one of the several district freight traffic committees on which the shipping public is represented; committees having been created since these applications were filed with the administration. The committees will be requested to give preferred attention to these applications.

This means that the basic rates will not be changed, but that unlooked for and unjust applications of them in particular instances can be straightened out.

Lime Manufacturers Must Make Pledges of Co-operation

To Obtain Place in Preference List of War Industries Board Producers Must File Individual Pledges

PENDING A FINAL DECISION on the status of agricultural lime and limestone by Judge Parker of the War Priorities Board lime manufacturers MUST make out individual standard form pledges. The new draft covers practically every able-bodied man in the United States and manufacturers who do not file their pledges will shortly be deprived of labor as well as fuel and transportation.

The pledge is worded in substance as follows: The manufacturer pledges himself not to permit any of his products to be used save (a) for essential uses (as defined by the Priorities Division of the War Industries Board) and (b) under permits in writing signed by or under authority of the Priorities Division of the War Industries Board; that he will make no sale or delivery of his product until the customer has filed a similar pledge.

In addition the manufacturer must send in a monthly report on P. L. Form No. 3 (see elsewhere in this issue) showing the deliveries and uses made of his product during the preceding month, as required by the Building Materials Section of the War Industries Board. Failure to send in the report regularly automatically removes a plant from the essential list.

The War Priorities Board is still receiving applications from lime plants for places on the Preference List for coal and transportation, and for such other protection as is provided by this classification for the operation of the plant in its production for essential needs. If the manufacturer has not already filed a pledge as described, he must file one with this application. The application must be made on P. L. Form No. 1, copies of which can be obtained from the Lime Association, Riggs Bldg., Washington, D. C.

Lime plants on the Preference List are not required to make application to the Priorities Board on P. C. Form No. 15, in order to obtain preference in the production and delivery of supplies, materials, or other equipment, when orders for such supplies, etc., are placed by or are for use in connection with an industry or plant appearing on the Preference List.

Each such order, as defined above, will automatically be classed in Class C, provided the person or company intending to use the materials, equipment or supplies ordered shall file with, and as a part of the order on the supplying company, an affidavit in writing in the following form:

Unless rerated by the express order in writing by the Priorities Committee of the War Industries Board, this order is by authority of said Priorities Committee rated as Class C under and by virtue of Section 9 of Circular No. 4, issued by the Priorities Division of the War Industries Board of date July 1, 1918, and all amendments thereto.

For the purpose of securing the said rating, I do solemnly swear:

(1) That I have taken and filed whatever pledge is required by the War Industries Board from the industry of which I am a member, and

(2) That the materials, equipment, or supplies covered by this order are intended for use, and will be used, for the purpose or purposes mentioned and referred to in Section 5 of said Circular, and for no other purpose.

This affidavit must be signed and sworn to before a Notary Public.

In sending the foregoing affidavit with the order, it is necessary to inform the company furnishing the supplies, that the plant is on the Preference List and entitled automatically to the classification of Class C, under the provisions of Circular No. 4 of the War Industries Board.

Full details in regard to Circular No. 4 and the system of automatic classifications were published in Rock Products, August 14, 1918, pp. 15-18. It should be borne in mind, however, that these classifications (Circular No. 4) are primarily designed for the guidance of steel manufacturers (including of course machinery manufacturers) in rationing steel.

Lime Association Grows

THE NAMES of 106 manufacturers are now enrolled as members of the Lime Association. This represents a larger co-operative effort in the lime industry than has ever before been undertaken. New members are being added to the list daily. Better join now while the joining's good.

BUY LIBERTY BONDS

Illinois Road Builders Hurry Up Work

FOLLOWING the announcement from Washington on Sept. 25, that road work would be allowed to proceed until Nov. 1, Illinois road contracts did not allow grass to grow under their feet. At 35 points in the state contractors are said to have resumed work immediately on jobs which have been held up since Sept. 10.

BUY LIBERTY BONDS

U. S. Department of Agriculture to Extend Soil Liming Investigations

RESEARCH WORK and scientific investigations of the practice of soil liming heretofore conducted by the Division of Chemical Investigations of the Bureau of Soils, under the direction of Dr. William E. Shorey, who has resigned, will hereafter be handled by the Division of Fertilizer Resources of the same Bureau, of which F. W. Brown is Chief.

Dr. C. C. Fletcher, who is associated with Mr. Brown, as a scientist of this Division, will give attention to the liming study, and it is understood that he will plan shortly to visit a number of lime plants to investigate the various methods of quarrying, conveying, grinding and pulverizing, calcining, packing and shipment of lime and limestone products as used in agriculture.

BUY LIBERTY BONDS

Uniform Cost System for Lime Manufacturers Progresses

MEETINGS are being held or will be held soon in all the fourteen districts of the War Service Committee on lime. At these meetings the expert cost accountant of The Lime Association will demonstrate the proposed uniform cost system which now has the approval of the Government. At these meetings full details and complete instructions as to its operations will be placed in the hands of manufacturers.

Many things of vital importance to all lime manufacturers will be taken up at these meetings and it is extremely important to the welfare of the lime industry that the meetings have a 100 per cent attendance.

BUY LIBERTY BONDS

Fertilizer Manufacturers Now on Preference List

PRODUCERS of phosphate rock, lime and limestone ARE NOT on the Preference List No. 2 (Rock Products, Sept. 25, p. 12 and 13) under Fertilizers, as industries. The War Industries Board will, however, give consideration to individual plants.

It is stated that: "A complete list of fertilizer manufacturers has been furnished the Priorities Board by the Committee on Fertilizers of the War Industries Board, and said companies have each been listed in Class IV, and all included under the general heading "Fertilizers," although not known individually in Preference List No. 2."

The Committee on Fertilizers is composed of representatives of commercial fertilizer manufacturers. Nuff said!

Work of the War Service Committee on Mineral Aggregates Is Outlined

Operators Must Give Individual Pledges, Apply for Place on Preference List and Make Monthly Reports or Cease to Operate

AT THE MEETING of the War Service Committee on Mineral Aggregates at Washington, D. C., Sept. 25, the industry was formally placed on the same footing as other building material industries. Plants which cannot show good and sufficient cause to continue operations as essential industries must close down in the immediate future. This, however, is not a matter of any great moment because there has been nothing but essential business to be had in several months.

Producers who wish to continue operation must make pledges on standard forms (obtained from the Building Material Section of the War Industries Board) not to furnish material to a construction project which has not been declared essential. Such essential construction is:

1. Project undertaken by the
   (a) Army and Navy Departments.
   (b) U. S. Shipping Board.
   (c) Bureau of Industrial Housing.
   (d) U. S. Railroad Administration.
2. Construction work directly connected with the production of coal, coke, ores and metals and the production (but not refining) of mineral oil and natural gas.
3. Public highway and street improvements when expressly approved by the U. S. Highways Council.
4. Repairs of extensions to existing buildings involving a cost not exceeding $2,500 and new construction for farm purposes only not exceeding $1,000.

With this pledge they may file an application (on a standard form) for a place in Class IV on the Essentials List. After being placed on the Essentials List they must file with the Building Materials Section of the War Industries Boards, monthly reports, like that shown herewith in order to keep the plant on the Essentials List. Failure to turn in the monthly report before the 15th of the succeeding month automatically removes the plant from the list.

Committee Work

It will be necessary to continue to supply material for uses which are deemed essential by the War Industries Board, although the amount will naturally vary considerably in different localities. The production of ballast, fluxing stone, engine and motor sand, moulding, core and blast sand, concrete aggregates for all approved building work, including highway construction, cannot be entirely stopped. Each district committee will be expected, therefore, to work out a plan whereby the necessary supply of material may be maintained at the greatest saving of fuel, labor, transportation and other operation essentials.

Probably the most logical method for accomplishing the desired economical results in the districts that will have a greatly restricted demand, will be to arrange for plants to run in sufficient numbers only to supply the material actually required. The perfecting of a suitable plan, based on conservation principles, for closing down some plants while arranging for others to operate will be one of the first problems for consideration and solution.

Assessment Not Decided Upon

The amount that producers will be assessed on their 1917 tonnage was not decided upon at the Washington meeting. The original estimate of the expenses of the War Service Committee of the industries was placed at $10,000. Probably a somewhat larger sum will be required.

Tonnage reports for ninety-odd per cent of the producers on the mailing lists of the

P. L. Form No. 3

WAR INDUSTRIES BOARD
PRIORITIES DIVISION
WASHINGTON

MONTHLY REPORT OF OPERATION MONTH OF _____, 191

INSTRUCTIONS

The Priorities Board will be guided by this report in considering the merits of the plant for continued inclusion in the **Preference List** of Industries and Plants; therefore, it is important that it be mailed as promptly as possible after the first of each month. **Plants whose reports are not received by the 15th of the month will be dropped from the list.**

Separate report should be made for each plant.
See reverse side for "Definitions of terms."

Name of company.....

Location of plant.....

	Percentage for month.	Close approximation for succeeding 60 days
Distribution of production:		
1. Direct Government orders		
2. Indirect Government orders		
3. Work of exceptional or national importance (As defined on reverse side of this blank.)		
4. All other work		
TOTAL	100%	100%

State unit of production used in arriving at the above percentages.....

Further information conceived to be of importance in connection with this report.....

.....

.....

.....

The undersigned being first duly sworn on oath, says that the statements containd in the foregoing are full, true, and correct.

Subscribed and sworn to before me this.....
day of..... 191 .....
(Name of company.)

..... *Notary Public* By .....
(Name of official.)

in and for..... 3—8754.

Monthly report required of all plants that get on Preference List

committee indicate a total of about 70,000,000 tons, in which case the assessment is hardly likely to be more than 2/100 or 25/1000 of a cent per ton which would yield a fund in the neighborhood of $15,000.

Summary of Present Situation

The present status of the industry cannot be more admirably summarized than as follows, in the words of Parker M. Lewis, member of the War Service Committee for the Illinois District:

"The producers of stone, sand, gravel and slag must realize the necessity for conserving capital, fuel, labor, transportation and all materials used directly or indirectly in the prosecution of the war. By following a strict and comprehensive conservation program the hope is expressed that the strife will be ended within another year, but unless every resource is made available for providing quickly the necessary articles of war, the conflict may be drawn out indefinitely. When it is made plain that the number of men killed and wounded in battle is being decreased in the same measure that munition and other essential war supplies are being increased, then no truly American business man will give first consideration to his selfish interest, and on the other hand will make, willingly, such sacrifices as may be required.

"The War Service Committee on Mineral Aggregates has an important mission to perform in helping to bring about a clear understanding of the urgent need for conservation.

"It may be taken for granted that the War Industries Board has no desire to interfere, beyond the point demanded by war needs, with the activities of any industry which is helping to create the wealth of the country. All industries are being accorded the same treatment with respect to restrictions placed upon their operations and the disposition of their output, the test being: To what extent will the product manufactured contribute directly or indirectly to the winning of the war.

"It is apparent that there are many classes of building work, including highway construction, which might be considered desirable and even essential in normal times that now may be deferred in order to release materials, especially iron and steel demanded for war purposes.

"The prospects are that the greater part of Government construction work will be completed within the next six months and after that time there will be a gradual, if not sharp decrease in the amount of building that will be permitted to proceed. On the other hand, the cessation of direct Government work might make it possible to allow many classes of construction to proceed to a greater degree.

"The shortage of labor will become more and more acute as the recent and former drafts draw an increasing number of men from their usual occupations into the army, or into direct war work. It should be borne in mind that the local supply of labor does not cover the case. For instance, men may be available in a given district for carrying on a construction project but their work is dependent upon the labor of men engaged in the production of steel, the mining of coal, the running of trains, and countless other activities of major importance.

"The maintenance of an adequate supply of labor may be considered the most serious problem with which the Government is confronted in connection with the fulfillment of the war program.

"The War Industries Board will control absolutely the industrial affairs of the nation during the period of the war; it is obvious, therefore, that any industry which wishes to contribute its part to the winning of the war, and at the same time preserve itself to the fullest extent possible under the existing emergency, should be in close touch with this agency which permeates every war activity."

BUY LIBERTY BONDS

Road Work May Proceed Until November 1

ONE RESULT of the conference of the Committee on Mineral Aggregates with R. L. Humphrey, chief of the Building Materials Section of the War Industries Board, on September 25, was to obtain a modification of, or supplemental ruling on, circular No. 21, issued September 3. The new circular dated September 26 states:

"Contractors and others engaged in the construction of streets, pavements and roadways now substantially under way are authorized to continue such construction, and manufacturers and distributors of and dealers in materials used in connection therewith may continue to furnish same for such construction work up to November 1, 1918. Applications for permits should be promptly made to the United States Highways Council through the State Highway Department for the completion of all such work now under contract and under construction which cannot be completed prior to November 1st.

"No new contracts for the maintenance, construction or reconstruction of streets, pavements and highways should be entered into or no new construction not now in progress undertaken, either prior or subsequent to November 1, without first obtaining a permit from the United States Highways Council through the State Highway Department."

Oct. 3, J. E. Pennybacker, secretary of the Council explained by letter that the order of Sept. 26 "is intended to apply to maintenance and repair work as well as to construction."

On September 17, an important meeting was held in Washington by Highways Transport Committee of National Council of Defense after which Committee called at White House and had half hour conference with President Wilson on the highway program and policy for war and after war periods. This meeting may be the most far reaching and beneficial to road improvement of any meeting yet held.

Government Authorizes Fuel Pooling by Cement Manufacturers

SPECIFIC AUTHORIZATION to pool their manufacturing facilities is given to cement producers in a recent circular of the U. S. Fuel Administration. It is probable that the same authorization is, or soon will be, extended to all producers of building material, including sand, gravel and crushed stone.

The circular gives the rules and regulations for applying the recent 25 per cent cut in fuel allowance to the cement industry. No manufacturer of cement is allowed to consume, during the present calander year, in excess of the amount required to produce 75 per cent of the average annual output of cement of such plant during the period January 1, 1915, to December 31, 1917. Exception is made where the production in excess of this 75 per cent is required in the interest of the United States Government and a permit has been issued.

Peat and wood when not requiring railway transportation may be used, but in such case the local State Fuel Administrators must be notified. Any manufacturer violating these regulations may receive a heavy fine.

The rules state: "That whenever two or more manufacturers of cement shall find that a further fuel economy would result from combining and using jointly the allotments of fuel to their several plants permitted by this regulation, upon application to the United States Fuel Administration, and upon receipt of a permit therefor, such manufacturers may use at one or more of such plants to be operated by them jointly sufficient fuel to manufacture 75 per cent of the aggregate of the average annual production of all such plants when operated separately, the manufactured product of such jointly operated plants being distributed to the individual manufacturers as may be agreed between them."

No Inducement to Fuel Economy

The wording the regulations is interesting because it specifically limits the fuel in terms of cement production. Manufacturers are not permitted 75 per cent of their former fuel consumption, but can only make 75 per cent of their former output. Hence fuel economies which might effect a 25 per cent fuel saving and give the same production of cement are not admissible.

Does Uncle Sam Need Sand?

Not Grit or Pluck, Most Assuredly—But the Mineral, YES; for the Most Essential War Industries Require Lots of It

By V. O. Johnson
President, Lincoln Sand and Gravel Co., Lincoln, Ill.

IF the reader doubt that sand is a war essential let him recall that the furnishing of sand and gravel to the Huns has been and still is a bone of contention between the Netherlands Government and the Allies.

WHILE SAND IS PROBABLY the most widely scattered of all natural deposits, is the most easily accessible from a mining standpoint and the cheapest and oldest of all building materials, the industry of excavating, washing and screening it for the many uses to which it is being put in various markets is comparatively young. Most of the plants now producing sand for commercial purposes are less than a dozen years old and a majority of them are not much over half that age.

Formerly, each community had its local source of supply—a convenient pit, hill, creek or lake—from which material was hauled by teams and used in a more or less crude and limited way, without other preparation if any than dry screening by hand. With the development of the cement industry, however, and the effectiveness of its propaganda "Concrete for Permanence," coupled with the increasing cost of lumber, as well as the growth of engineers who insisted on washed and graded aggregate for concrete or to meet other building material specifications, and who recognized its varied adaptibility, the sand and gravel industry took on a greater importance, began to enlist capital in a small measure and to attract the attention of rail and water carriers as a revenue-producer.

The extreme variety displayed in the formation of deposits—some under water, some in hills, some mixed with gravel, boulders or clay; others covered with rock or shale—has greatly retarded their development as commercial propositions. Equipment designed for one deposit was found unsuitable for another. Washing and screening processes had to be adapted to each deposit and plants developed under widely varying conditions of fuel and water supply, labor and transportation. Furthermore, most of the pioneers in the business were without broad business experience, lacked technical or mechanical training, and were men of small means but willing to stake their all on the chance of big profits. Usually these profits failed to materialize but when they did were usually invested in enlargements and betterments, and so, despite heavy handicaps, the industry grew and more and more became a factor in the business world.

Becomes a Real Industry

The past five year period has witnessed a phenomenal growth in the development of sand and gravel deposits. Engineers have arisen who can design efficient plants; machinery has been developed under their guidance and the dictates of experience that has increased production, improved the quality and lowered the costs; and the experience gained in earlier years, often at a high premium, has enabled the operators of plants to increase their output, prepare their product more carefully and conform to market and traffic conditions more closely. Trade journals have been a means of disseminating information as to many phases of the business; state associations have given direction to efforts at bettering conditions, especially as to freight rates and cost data, and a continually increasing demand for the material has proven a stimulus unheeded by only the most unprogressive.

Today, the sand and gravel industry, whether judged by the amount of money invested in it, or by its importance as an employer of labor, or its tonnage of freight, ranks well up with the other industries of lime, lumber, cement and brick. In fact these industries are directly and vitally dependent on it. Lime without sand makes no mortar. In building, lumber finds its foundation partly composed of sand. Cement without sand will not form concrete, nor will brick serve their purpose unless laid in sand.

Largest Development in Middle West

Plants for the production of sand are scattered over the country from end to end, reaching their highest development and most extensive operation in the Middle West, where rivers, great and small, are continually forming deposits, where many lake beaches constitute an inexhaustible supply of material, and where glacial deposits are spread on the surface or deposited in hills or concealed beneath the fertile prairies, in endless profusion.

The Illinois State Highway Department lists a total of 65 plants within the borders of that state, varying in capacity from five to eighty cars and totalling upwards of 2,000 cars per day. The six states of Illinois, Ohio, Indiana, Michigan, Iowa and Wisconsin produce about forty per cent of the total annual production of the country, amounting to over 89,000,000 tons and having a value of nearly $30,000,000.00 (Geological Survey, 1916).

Compared to steel, copper, oil or coal these figures are not impressive nor should the importance of the industry to the business welfare of the country during these war times be measured by them. The rapid development of the industry, however, in response to business demands, and its present size, and the extent to which other lines are dependent upon it, does afford a measure of its economic value and the necessity for its unhampered continuance, strictly as a war measure.

Manifold Uses of Sand by Railways

A detailed examination of the uses to which sand is put is not only surprising to those who have not given the matter attention but confirms the contention of its being a basic and essential product even in our wartime industry. Our railroads at the present time are being operated at almost the extreme limit of their capacity and anything having to do with their maintenance or operating conditions is a matter of vital importance. Few realize, however, that not a locomotive starts anywhere in the country without the use of sand—**engine sand**—piped to the rail to avoid slippage of the driving wheels. In 1916 (later figures are not available), in addition to the large quantities produced by the roads themselves from their own pits, there was produced and sold to the railroads of the United States, 1,383,034 tons of sand for this purpose alone.

In the same year the railroads bought upwards of 14,000,000 tons of **sand and gravel ballast**—and at that most of them were not buying as much as they needed, and many were producing their own ballast from pits owned or leased by them. Bridges, piers and docks require sand. Warehouses, roundhouses and stations cannot be built without sand. Foundations for interlocking plants and signal devices; freight and passenger platforms—made of concrete—demand sand. If anything is vital to our railroads, it is sand, as there is no substitute for it and without it their operations would be seriously hampered.

Sand Necessary in Coal Mining

We also hear and read a good deal these days about the production of coal. Some of us who operate sand and gravel plants in coal-producing regions and can secure only such equipment for shipping our products as the mines do not need for shipment of their orders or storage of slack and other grades for which there is not a ready mar-

ket, are coming to feel that less effort to stimulate production in the newspapers and more at the mine shaft would improve conditions greatly.

However that may be, coal mines use large quantities of sand. Underground haulage motors require engine sand. A large amount of sand is necessary for the underground concrete work. Often the main and escape shafts are concreted to avoid water leakage—and sand is necessary. Top-works rest on concrete foundations—requiring sand. Concrete is fire, water- and rot-proof and is replacing wherever possible all props and timbering formerly made of wood. The same is true of copper, iron-ore and other mines producing war necessities.

Sand in Highway Maintenance—Building Construction

The government has recognized the necessity of maintaining our hard roads as a means of transport to relieve the railroads in some cases, in others to facilitate the rapid and economical movement of food products. Again sand—whether the road be of brick, concrete or macadam.

Practically every building, whether it be a munition factory, steel mill, grain elevator, flour, feed or starch factory, requires sand in greater or less measure both in its original building as well as its maintenance. Not a cantonment can be built without sand, nor a rifle range, an aviation field or even a detention camp for interned enemies.

Steel foundries, working night and day on government orders, cannot make the simplest casting without sand—either **core or moulding sand.** When made, the castings are cleaned with blast sand. The machinery for polishing, fitting and assembling these castings, rests on concrete, made of cement, gravel (or stone) and sand

Even the Farmer Uses Sand

The farmer, too, calls on the sandman for assistance in producing and storing his food-crops. Sand for his hog- and stock-feeding floors, built of concrete. Sand for his silos. Sand for his barn and granary foundations. Sand for his concrete fence-posts, water tanks, tile drainage and culverts. Sand, too, for the concrete floor of his Henry Ford garage.

Many Other Uses

There are many other uses for sand than those enumerated—**furnace sand, glass sand, filtration sand and polishing sand.** Sand for reclamation, drainage and other construction work directly improving or increasing our farmable land. Sand used in roofing, in floor cleaning and polishing preparations, and for making sand-paper. Further mention would be unnecessary. A little consideration will convince the honest inquirer that sand, (and in a lesser degree, gravel) is one of our most important national resources, deprived of which much of our industry would be seriously curtailed.

Plants Cannot Operate for Essentials Only

Not all of these plants are producing material which might be classified as "essential" in these times. At many of them only a portion of the output—certain grades—can be so classed, the balance going to other useful but strictly necessary war uses. This is an inevitable feature of their operation and one that cannot well be remedied without putting the entire cost of operation on the so-called essential product.

For instance, a plant holding orders for engine sand—a fine grade of sand, usually specified as ⅛-in. and under—will excavate the sand from a bank, pit or river, convey it to a washing and screening plant and there separate the coarser from the finer grades. The coarse sand and gravel can be used for hard-roads, building or any form of concrete work and the amount received therefore, will bear a share of plant costs, thereby lowering proportionately the cost of producing the engine sand.

Economic Conditions Take Care of Non-Essentials

Economic conditions are quite effectively limiting the operating of those plants whose products are used for "non-essential" purposes. The scarcity of labor and high wages thereof, soaring cost of and delay in getting building material, to say nothing of Government limitations, have curtailed almost to the vanishing point ordinary building operations requiring sand and the sandman finds himself unable to get orders and is obliged to close his plant. Some are in this position now and others see themselves in it in the near future, while some are operating on part time only and hoping to pull through until better times. The result is that most of the plants in operation today are engaged in the production of material more or less indirectly but none the less vitally necessary for the carrying on of strictly wartime activities.

What with car shortage for two years past, scarcity of labor, delays in getting needed repairs to maintain its plants, greatly increased operating costs and dwindling orders, the sand industry has been bearing a heavy war burden. With its plants owned mostly by individuals or small corporations, consisting of many units more or less widely separated; isolated as to locations usually in creek bottoms, river banks, hillsides or prairies; remote from big business centers and deprived of the advantages of close association with each other or other business; engaged in an occupation that means close contact with dirt, grit and grease, long hours and exposure to all sorts of weather; with its organizations crippled by the absence of many in the service, the sand and gravel fraternity of the country is proving its loyalty and claiming its right to participate freely in winning the war and pledges its money, labor and brains to the end of the fight.

Uses of Crushed Limestone

In Many Cases an Absolute Class 1 War Essential

THE following list has been prepared from various sources, although credit for the bulk of it is due to A. Acton Hall, president of the Ohio Marble Co., Piqua, Ohio. Mr. Hall has already succeeded in getting his plants on the preference list for labor and fuel.

FLUX FOR BLAST FURNACES

An absolute essential in war industries.

Without stone, no pig iron.

Without pig iron, no cannon—no munitions.

No steel for ships, small arms, etc.

Almost 1 ton of stone required in the melting pot for every ton of iron ore in all foundry work.

IN CHEMICAL USES

In U. S. Government air nitrate plants.

In soda ash plants.

In beet sugar industries—absolutely indispensable.

In other chemical uses.

IN AGRICULTURAL USES

Ground limestone for fertilizer and agricultural use is demanded in every experimental station in the United States in the aggregate running in demand to millions of tons.

IN MACADAM ROADS

Nothing but macadam is used in the War Zone, owing to speed in construction and repairs; and on account of its general reliability, it has practically been adopted by the armies of the world. In addition to this, it is used in practically every other type of road construction.

RAILROAD BALLAST

A standard high type ballast.

MINERAL AGGREGATE

In concrete work—involving about 10 per cent of product.

IN FOOD INDUSTRIES

An essential part of all balanced stock food, especially for poultry.

IN ITS GROUND OR PULVERIZED FORM

In soap.

In putty

In paint.

In paper.

In rubber.

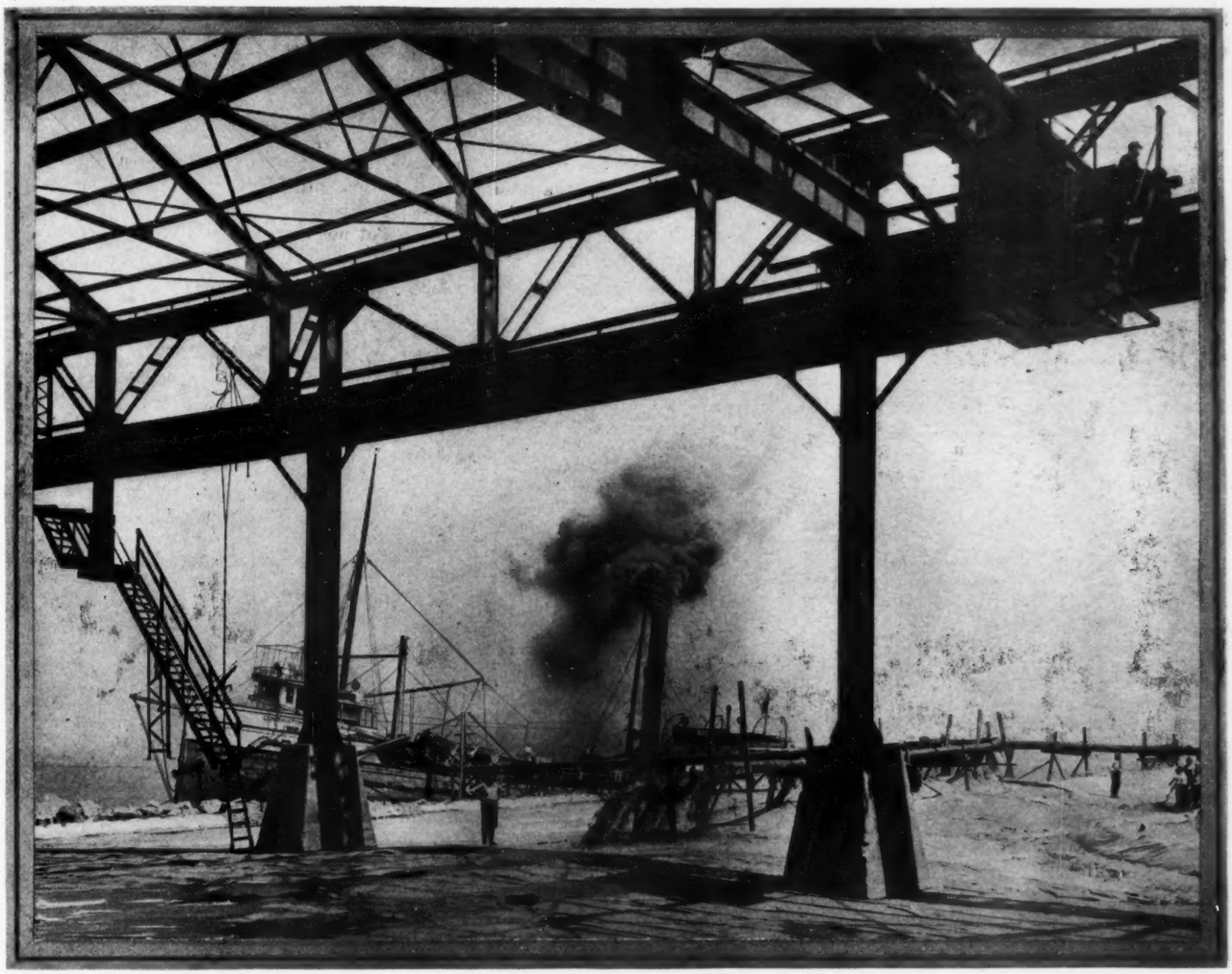
In electrical work.

In many chemical processes.

In all asphalt work.

In the manufacture of calcite, magnesite and other fire proofing materials.

In the manufacture of Portland cement and lime.



The L. L. Barth delivering mixture of sand and water on foundation site for big government plant at Indiana Harbor; fill will be as high as concrete pillars. Note construction work going on

Unloading a Sand Boat by Hydraulic Means Attended by Success

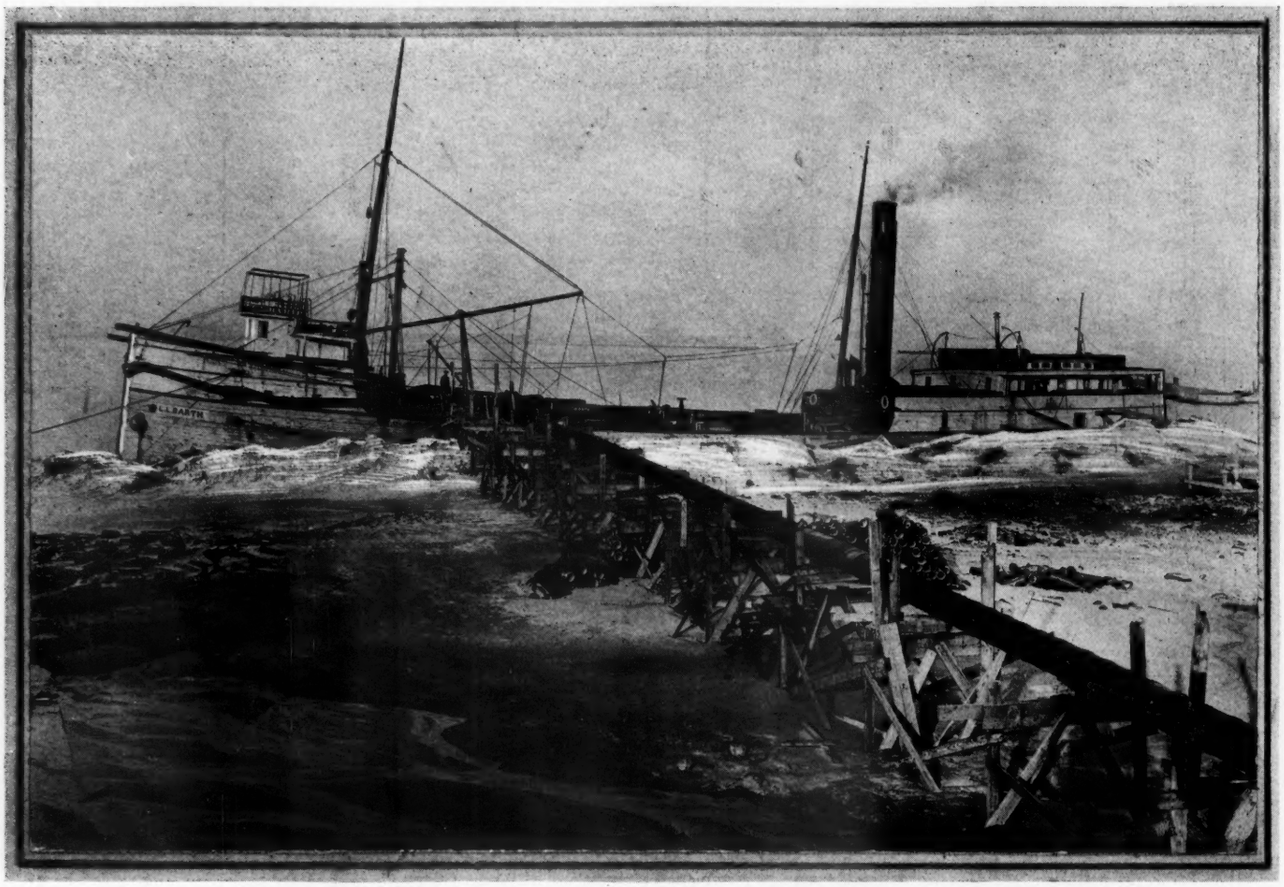
Construction Materials Co. Demonstrate by Two Years Steady Operation of the "L. L. Barth" that Pumps Designed by Their President, J. R. Sensibar, Are Efficient and Work Profitably

UNLOADING A SAND BOAT by hydraulic means always has been considered and actually found to be unsatisfactory and expensive, until two years ago, when J. R. Sensibar, president of the Construction Materials Co. of Chicago invented his system for which a patent was recently granted.

Theretofore all experiments along this line had been given up as impractical—as of no commercial value. But Mr. Sensibar, who is an engineer, persisted in his ideas and finally by especially designed centrifugal pumps and equipment was enabled to master conditions, and therefore to take contracts for big foundation fills (where buildings were under construction) that actually "stumped" other producers of sand.

The first contract of the kind was for the fill for the Field Columbian Museum on the Lake Front, Chicago, which required a fill covering 10 acres, 43 ft. deep, amounting to 250,000 cu. yds. How to deliver the material on the site without use of railway cars, bins, tracks and trestles and without interfering with construction work and endangering the exposed foundation pillars was too big a problem for many contractors.

Mr. Sensibar took the contract, and after trying out a conveyor system which did not prove satisfactory, owing to circumstances (the conveying machinery was efficient but the conditions demanded a different method), he set his pumps at work delivering sand into the foundation by pipes direct from the boat. He had been loading his boat, the "L. L. Barth" from the lake bottom near Gary, Ind. and unload-



What the L. L. Barth looks like; the pipe line through which sand is delivered at Indiana Harbor

ing by his hydraulic equipment into two huge bins near the museum site. So it was merely a matter of discontinuing the use of the bins and extending the delivery pipe to the foundation site.

Since that day having proven by actual demonstration the superiority of this method and its utter safety, he has been engaged on a still greater job—the fill at Indiana Harbor for the Mark Manufacturing Co., a government war plant, which calls for several times the amount of sand that was used on the Museum site.

The "L. L. Barth" has a carrying capacity of 721 cu. yds. Two 12-in. pumps do the work, one designed for a 30-ft. head and the other for a 70 ft. The former will lift from the lake stones 10 in. in diameter and the other material 4 in. in diameter. It is recorded that the former once sucked through intact an ax, including the handle.

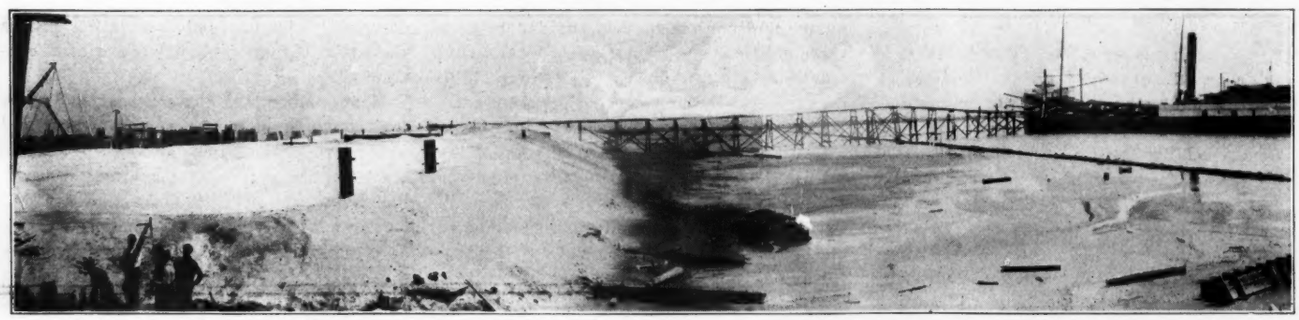
In loading both pumps are utilized. The boat is anchored as close in shore as is practical that advantage may be taken of the shallowest depth. Two pipes are lowered, one on each side of the steamboat and the pumps started. Sand and water are sucked in rapidly and in from one hour and 20 minutes to two hours the boat bins are full of sand, the water being displaced and escaping back into the lake. The pumps raise 82 per cent of water to 18 per cent of sand.

For unloading, the pump designed for 30 ft. head is employed in raising water to mix with the sand in the bins, and the other pump is used to suck out the mixture. For this purpose 75 per cent of water is used to 25 per cent of sand.

The mixture is forced sometimes considerable distances as at the Field Museum it was delivered through 1200 ft. of 14-in. pipe to a height of 47 ft.

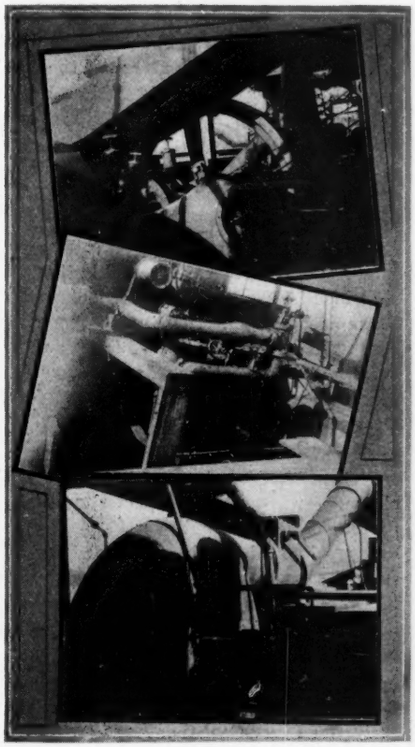
The boat is unloaded in from one hour and 40 minutes to two hours. The minimum time, one hour and 25 minutes is the record. This was done at the South Chicago yard of the company where there are five acres of ground storage, all material on it having been placed by hydraulic means.

It is the claim of the company that this system saves labor in unloading and time. Other boats depending on clam-shells re-

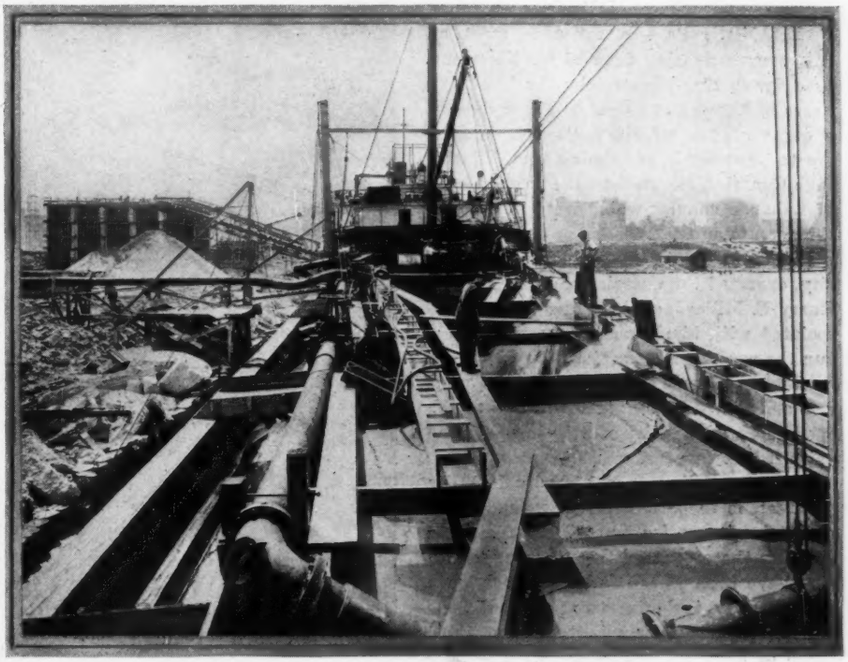


Part of the immense fill at Indiana Harbor and view of lon g delivery pipe built on a trestle from boat to center of site.

Views of Sand Steamboat "L. L. Barth" Being Unloaded and the Pumps



Views of the pumps that do the work



The middle bin of the boat being unloaded; the bin in foreground is still full of sand; the pumps are at the farther end of the boat

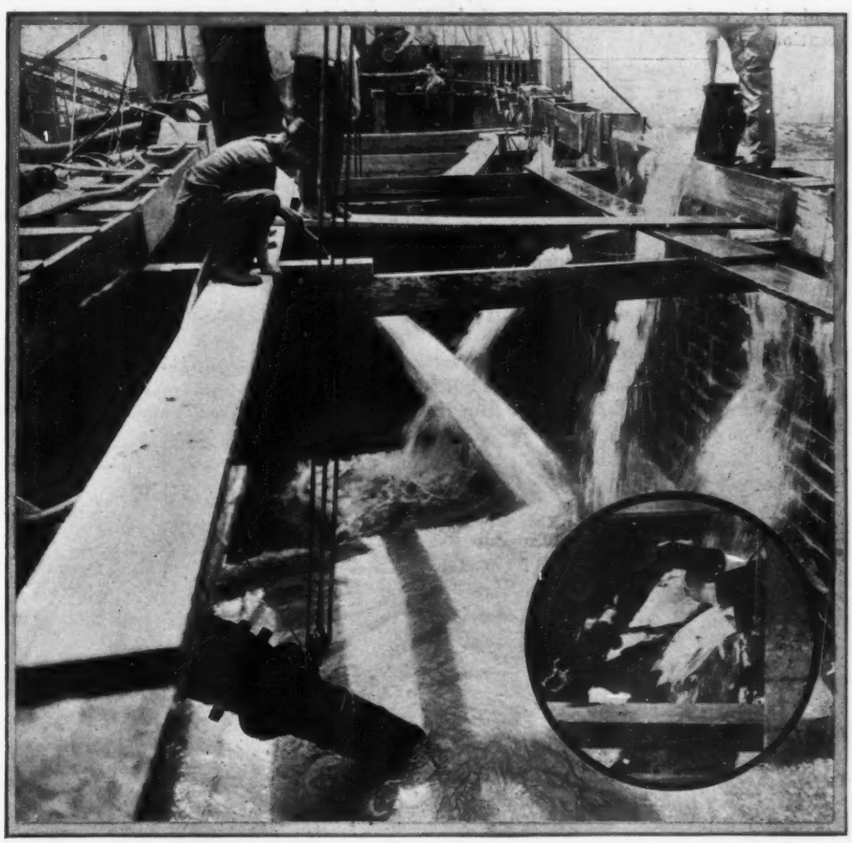
quire a longer time for unloading and additional help to operate the buckets.

By an ingenious arrangement of which Mr. Sensibar is the author, water pumped onto a location is allowed to flow back into the lake or stream rapidly. The water seeking lowest levels distributes the sand evenly over the site and thus the danger of displacing foundation pillars present in other methods is avoided. It was this very danger at the museum site that led to Mr. Sensibar's hydraulic invention.

According to Mr. Sensibar, the "L. L. Barth" holds the record for quantity transportation in a month, no other sand boat equalling its record irrespective of the length of haul. For seven consecutive days it carried three loads a day in days of 24 hours. One of the boats used for comparison had a haul of only four miles, while the "L. L. Barth" had 24 miles.

There are exactly 16 people employed on the "Barth" including the cook and assistant cook. These run all departments. In addition to the main pumps, there are 11 auxiliary pumps.

The Construction Materials Co. is a consolidation of the individual firm of J. R. Sensibar and the United States Sand Co., incorporated in Illinois with pits in Indiana. Mr. Sensibar owned half the stock of the United States company and at the consolidation he was made president, and J. A. Foley, another experienced sand man became secretary and treasurer. The main office of the company is in the Chamber of Commerce, Chicago.



Close-up of bin being unloaded; water is released from flume at right to dilute the sand; the man at left is directing a stream of water from a hose into a whirlpool for the purpose of breaking it, as it interferes with suction; the suction pipe is deep in the mixture in the lower part of the photograph. The insert shows the mouth of the suction pipe just before lowering into the sand and water

Open Old Quarries to Meet Flux Demand

LEBANON, Pa.—In order to meet an ever increasing demand for limestone, used for fluxing purposes by the blast furnaces in Eastern and Central Pennsylvania, a quarter of a million dollars, it is said, are to be spent in reclaiming the Millardsville Quarries, situated on the eastern edge of Lebanon county, which were abandoned three years ago.

For 20 years Jacob B. Millard, of this city, operated the quarries and now his son, Harry E. Millard, of Annville, who was associated with him for many years, has begun the work of reclamation. Purchase has been made of two farms adjoining the quarries and Mr. Millard plans to develop the operation to a capacity of fifty cars of stone daily, within a year.

A strata of limestone 1,500 by 1,200 by 400 feet, is to be uncovered, extending in depth for its entire length, 100 feet. As showing the extent of the undertaking orders have been placed for twelve car loads of machinery, including two pumps of 5,000 gallons capacity per minute and a third pump of 3,000 gallons capacity. They are to be used in keeping the operation, below water level, free of water. Seven locomotives of 150 stone cars, five steam shovels and a big crusher are included in the operation.

BUY LIBERTY BONDS

Gypsum Deposits Found in British Columbia

VANCOUVER, B. C.—Gypsum is found in British Columbia at the following places: Salmon River in the southern part of the Kamloops mining division; Spatsum on the main line of the Canadian Pacific Railway about 189 miles to the northeast of Vancouver; on the banks of the Thompson River about 20 miles north of the town of Kamloops; at Merritt in the Nicola valley and in the Tulameen district on Granite creek about 10 miles up the Tulameen river from the town of Princeton.

The Spatsum deposit is at least 2000 ft. long and 40 ft. thick. The layers are of varying hardness and purity but there seems to be no doubt that the deposit is capable of providing a large tonnage of very pure mineral. The property is so situated that the mineral could be delivered by aerial tramway directly to the Canadian Pacific Railway track at Spatsum on the opposite side of the Thompson river.

BUY LIBERTY BONDS

Big Gypsum Plaster Order for the Army

THE UNITED STATES recently ordered 585,000 lbs. of U. S. Gypsum Co. Quality Orthopedic plaster to be used in the army for plaster casts. The plaster is made from the pure white gypsum from Southard, Okla. The Government is said to be using the entire output of wall board and plaster board made by the U. S. Gypsum Co.

C. N. Ray, President Michigan Sand & Gravel Producers' Association

Michigan Sand and Gravel Producers' Association

FIVE more members have signed up with the newly organized Michigan Sand and Gravel Producers' Association. With the fifteen mentioned on page 19 of Rock Products of Sept. 11, this makes an initial membership roll of twenty. The new ones are:

Lennane Bros., Pleasant Lake, Ind.

G. W. Bunker Co., Grand Rapids.

Belknap Cement Products Co., Greenville.

Battjes Fuel & Building Material Co., Grand Rapids.

Michigan Builders' Supply Co., Detroit.

BUY LIBERTY BONDS

California to Have New Quarry Rules

THE Industrial Accident Commission of California has recently conducted a series of public hearings to consider quarry tentative safety rules. For some time committees of employers and employes have co-operated with the safety engineers of the commission in preparing the tentative rules and orders. A. R. Wilson, vice-president and manager of the Granite Rock Co. is chairman of the Quarries committee.

During the twenty-four mouths of 1915 and 1916 there were 32 fatal injuries, 60 permanent injuries and 2314 temporary injuries in the quarries of California. The total cost in compensation and medical fees was $176,034.

BUY LIBERTY BONDS

Crescent Cement Co. Buys 2,000 Acres to Develop

NEWCASTLE, Pa.—The Crescent Portland Cement Co. purchased the holdings of the Beaver Valley Coal and Coke Co. for a sum recorded as $1. However as close to 2,000 acres were disposed of, it is estimated by real estate dealers of Newcastle, Pa. that the property sold for $175,000.

The property runs along the Wampum Run for about three miles, and includes part of Big Beaver township and part of Wampum Borough. It is in one of the biggest coal districts in the country and has been producing coal for a half century. Experts figure that the mines are good for at least another century's production. The limestone holdings are also considerable.

Fifteen modern houses, equipped with all modern conveniences, electric lights, running water and built in the most up-to-date fashion, have been erected by the cement company, who will erect more within a short time. Everything possible is being done by the company for the betterment of their employes.

The property was purchased from the Beaver Coal and Coke Co., Ora R. Haber, Wampum River Coal Co., Matthew Gunton, Essie Leight, William Rufus Patterson.

BUY LIBERTY BONDS

Birmingham Slag Plant Gets Priority Orders

BIRMINGHAM, Ala.—Blast furnace slag is in such demand that priority orders have been obtained for the product to be handled out of Birmingham. The consumption this year may exceed the most optimistic expectations of officers of the Birmingham Slag Co.

The Nitrate plant at Sheffield requires a lot of the slag. The Chickasaw Shipbuilding Co., at Mobile, is using 1,000 tons. Camp McClellan will use the slag on the filtration plant being constructed and also on the road building that is proposed to the extent of 500 tons a day for not less than 60 days. The industries being constructed at Fairfield, part of the Tennessee Coal, Iron & Railroad Co., are using great quantities of slag.

While there are thousands and thousands of tons of slag being consumed these days, there is not a great visible reduction in the stock on hand, though statistics show that many of the larger piles are being cut into and the product heretofore considered a waste product, is being moved out quicker than it is dumped from the slag pots.

The local company handling the product has installed a great plant for the breaking up of slag and loading it at Ensley. Orders are being taken for the product from every direction, the principal trouble being in getting transportation.

Buffalo Crushed Stone Co. Quarry Has Gravity Track System

Return-Track Inclines and Switchbacks Save Locomotive Haul—Quarry Operated By Bench Method

YEARS OF EXPERIENCE in railway location probably account for the efficient and economical track layout General Manager James Savage has installed at the plant of the Buffalo Crushed Stone Co., Buffalo, N. Y. Mr. Savage is a quarry manager who appreciates that good alignment and efficient operation of a railway system are decisive factors in efficient quarrying operations. His track layout is the result of much thought and study and its efficiency has been proved by several years of successful operation.

Railway Track System

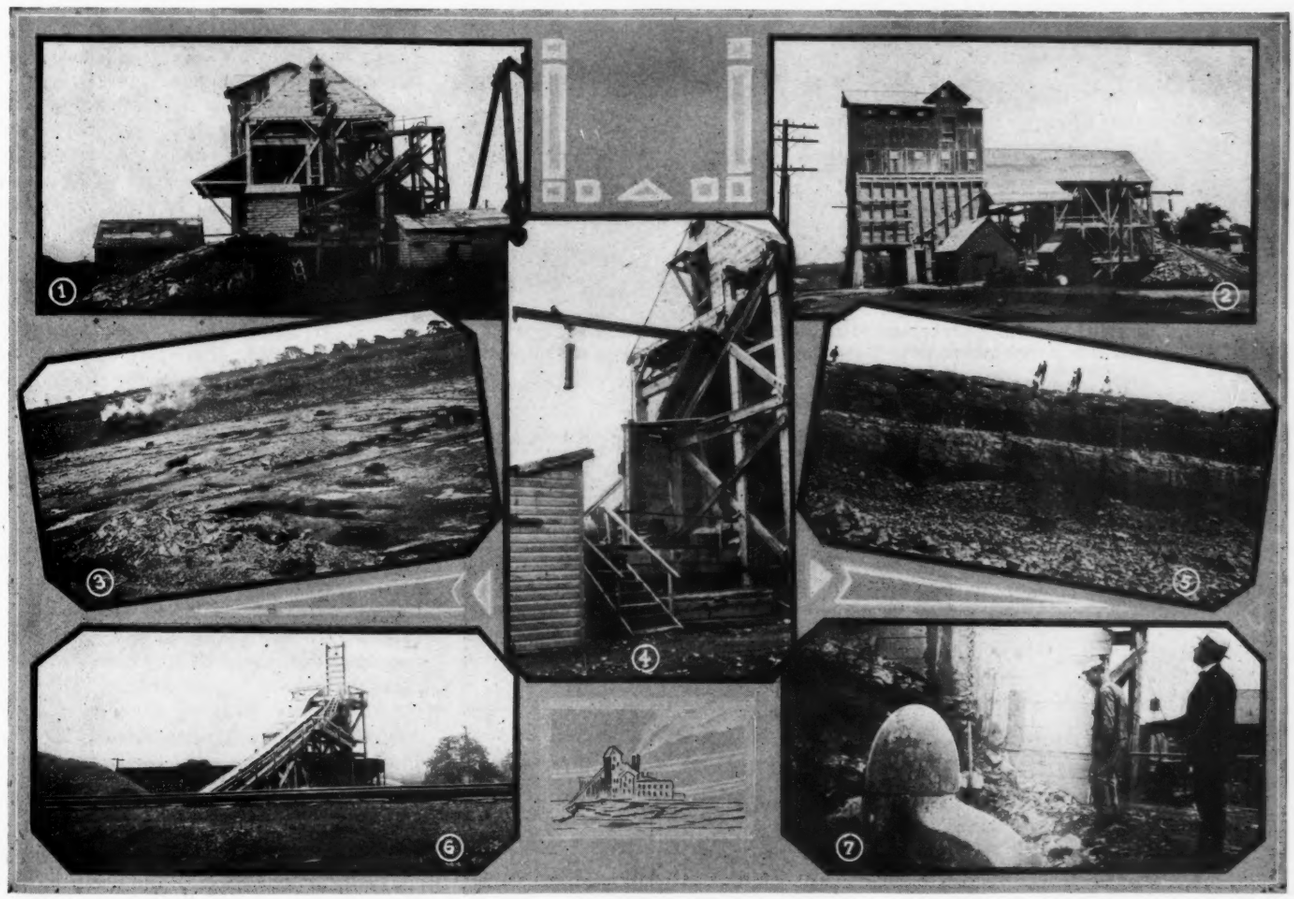
The general scheme of the track system and direction of car travel is shown in the accompanying sketch. The quarry is divided into three working sections, each served by a closed loop of railway track. The object, of course, is to have distinct zones for blasting operations and for steam shovel operations. The middle section may be served by cars traveling in either direction as determined by the location of blasting operations.

The middle Y of the loops permits short-cut routes to the crushing plant incline. The loaded cars are brought in on the stem of the Y which is depressed below the floor of the quarry as it approaches the foot of the incline leading to the crusher platform. (See middle picture, page 28.)

The hoist operator occupies a covered extension of the crusher platform (shown at the right looking up the incline; see picture). Here he has a clear view of conditions at the crusher and is in control of car movements on the incline.

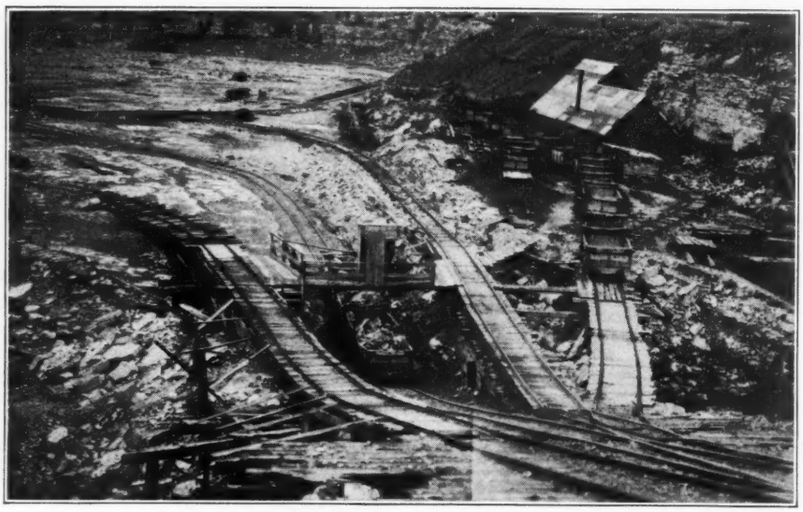
The cars are of the automatic end-dumping variety. They are let down the incline by cable, being switched to an outer track at a point about half-way down the incline. When opposite and about 15 ft. higher than the point where loaded cars start up the incline the end of the cable is detached from the empty car and dropped conveniently for attaching to a loaded car. The empty car then runs by gravity to a switchback where it is turned about so as to face correctly for dumping when it again comes to the crusher.

From the switchback the cars run by gravity to a collecting track for empties. Before the quarry working face had



(1) Crusher end of plant; (2) Crushing plant showing incline at the right; (3) Quarry floor; (4) Pneumatic hoist for operating crusher hook; (5) Two bench quarry operation; (6) Erie R. R. loading plant; (7) Crusher platform—General Manager James Savage "at the bat"

jIncline to crushing plant; empty car siding at the left; car repair shop and office extreme left



Looking down incline; depressed loaded-car track in center; tracks to switchbacks on either side; car-repair shop on extreme right

Switchback and siding for empties, showing gasoline dinky used for hauling

reached such large proportions the cars were dropped all the way back to the quarry face by gravity, so that the dinkies were used for hauling in the loaded cars only.

When a sufficient number of empties has collected for a train a gasoline dinky runs in behind the string of uncoupled cars and pushes them past the steam shovel for loading and thence to the foot of the incline. The dinky then backs away and turns around on its own switch and is ready for the next trip.

As will be seen from the sketch of the track layout, the switchback incline track system is in duplicate, one for each side of the crushing plant incline. From the right-hand down incline a track also leads off to the car-repair shop, so that defective cars are shunted out of the main system with the least possible expenditure of energy.

The cars hold about 4¼ tons and are hauled up the incline, dumped and returned at the rate of about one per minute.

Quarry in Residential Buffalo

The quarry is located in a fast-growing residential section of the city of Buffalo. This has its drawbacks as well as advantages.

The quarry face is 40 ft. deep and is quarried in two benches with air-operated tripod drills. The first stage drilling is by 15 ft. holes and the second stage 25. The stone is in strata so that the benches are separated by a plane almost perfectly horizontal.

A compressed- air pipe line, encircles the upper edge of the working face. Air is furnished by a steam-driven 2-phase, 2-stage air compressor of 1,000 cu. ft. capacity. The air is supplied at 100 lbs. pressure.

Mr. Savage has no fault to find with the efficiency of the bench method of operation as compared with the more common deep drill-hole method. The chief drawback of the bench method has been the cleaning off of the bench after blasting operations. At present prices for labor cleaning up by hand shovels and forks is expensive and Mr. Savage is on the lookout for a machine which will do this work efficiently.

Drainage Problem Simply Solved

Under the 40-ft. strata of limestone is a stratum of impervious shale, which held the water which seeped in through the limestone walls as well as the rain and melted snow. Under the shale is gypsum and similar formation.

After some years of pumping another method of drainage was tried. This was to drill a 6-in. hole about 90 ft. deep in the quarry floor down into the gypsum formation. Then two charges of nitroglycerin were exploded at different depths just as oil wells are blown. The result has been a dry quarry floor under all conditions and no pumping necessary.

Crushing Plant

The principal features of the crushing

plant are shown in the group of views on page 27. The initial No. 12 gyratory crusher is on a platform in the open. A stiff-leg derrick alongside the platform answers the purpose of a crane in handling repair parts. The hook for clearing the crusher opening is suspended on a traveler running on the lower flanges of an over head I-beam, which can be swung over any part of the crusher. The hook is operated by an air-piston type of hoist by two bell ropes from below.

From the initial crusher the crushed stone goes by elevator to a scalping screen, the tailings of which feed two smaller gyratory crushers, a No. 6 and a No. 7. These are roofed over, but the sides of the structure are not enclosed. The sizing screens and the finished stone bins are completely enclosed.

Loading Out Tracks

Shipping facilities are provided on two railways, the Delaware, Lackawanna & Western and the Erie. A single track is provided under the loading bins. Above the bins this track branches into a lateral track on either side by means of a two-way switch, the three tracks providing storage capacity for 50 empty cars. The cars are dropped down under the loaded bins from all three tracks by gravity.

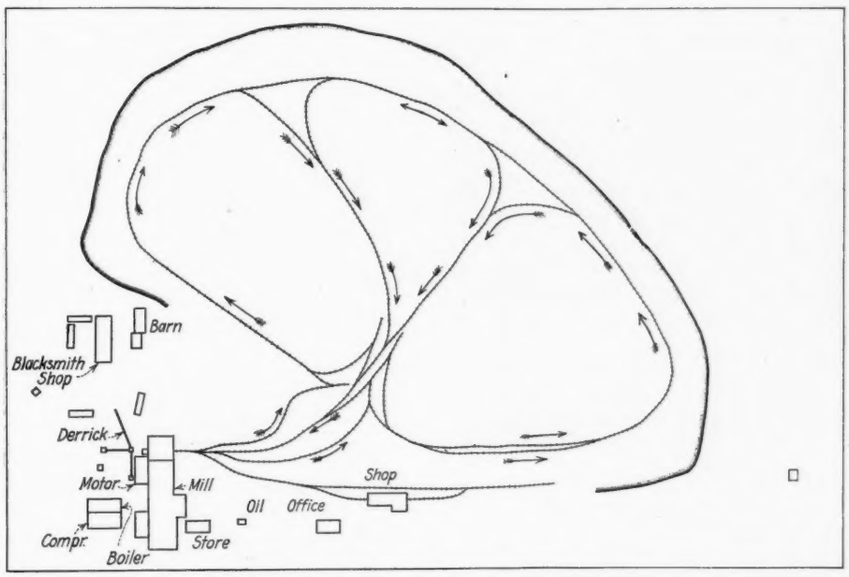
Near view of switchback with car at top

A similar arrangement of three parallel tracks below the bins provides for storing 50 loaded cars. A switch connects these tracks with a siding outside of the bins so that any or all the loaded cars may be taken out without disturbing the car or cars under the bins, or the empties above. For shipping on the Erie R. R., which is some distance away from the plant the stone is removed from the bins by a chute to a conveyor in a concrete tunnel which passes under the tracks of the D., L. & W. After emerging from the tunnel the belt conveyor rises on a trestle at an angle of 21 degrees to the point where it discharges into cars spotted by gravity on the Erie R. R. siding. In connection with this siding is a storage yard of large capacity served by a locomotive crane.

Superintendent's Observation Office

Located right on the rim of the quarry, several hundred feet from the rest of the plant is the superintendent's office. From its windows the superintendent can see any and every part of the quarry as well as the operation of the incline and crusher. Without stirring from his office chair he can see if everything is moving smoothly, or if there is any trouble he can soon locate it.

The superintendent is Arthur S. Savage, who is a brother of James Savage, the general manager. The president of the company is F. W. Schmidt, of Morristown, N. J.



Sketch plan of track layout—not drawn to scale

New Stone Crushing Plant at Amherstburg, Ont.

AMHERSTBURG, ONT.—A large stone crushing plant has been completed at the Brunner Monds works here with a capacity of 1500 tons of crushed stone per day.

The machinery is of the very latest type. The stone passes automatically from the quarry, through the crushers, elevators and screens into the stone bins and onto the cars without being handled by manual labor.

At the quarry the stone is loaded into the cars by means of a steam shovel and is pulled up the trestle 300 ft. long and 60 ft. high by an electric car haul situated in the top of the crusher house. The cars dump the stone into the larger of two crushers, which weighs 90 tons. From here it passes through a revolving screen 5 ft. in diameter and all the stone over size passes on to the smaller crusher which weighs 50 tons.

From the second crusher the stone is raised by a bucket elevator into the screen again and the former process is repeated until all of the stone passes through the screen.

The screen discharges into another continuous bucket elevator raising the material into the sizing screen house where it divides into two streams and passes through two large screens 7 ft. in diameter. Each of these screens is double. They separate the crushed stone into three sizes, namely, dust to ½ in., ½ to 1¼-in. and 1¼ to 2½ in. These three different sizes drop into three different bins the total capacity of which is 1200 tons. The bins discharge through chutes and gates directly into cars which pass under the storage bins on a double track.

The entire machinery in the crusher house is driven by electric motors, the power for which is generated at the new generating plant which has just been installed at the quarry consisting of a large 300 k. w. Turga generator driven by steam from three boilers each of 200 h. p. capacity.

Liberty Bond or Liberty Bound, which will you have it?

"Lime-Fertile" a New Limestone Phosphate Fertilizer

Mixture of Limestone and Rock Phosphate Inoculated with Nitrogen-Fixing Bacteria

LIME-FERTILE is the trade name given to a new fertilizer product made by the Kelly Island Lime & Transport Co. for the Fertile Chemical Co., Cleveland, Ohio. It contains 80 per cent of finely ground limestone and 20 per cent of finely ground phosphate rock and a variable bulk of all-crop bacteria grown in the laboratory.

It is claimed that experiments have shown Lime-Fertile to produce more evidences of nitrogen than a commercial fertilizer containing 10 per cent by bulk, more evidences of phosphate than a commercial fertilizer containing 6 per cent by bulk, and more evidences of potash than a commercial fertilizer of 3 per cent by bulk.

The following paragraphs are taken from a booklet, "the Sales Basis of Lime-Fertile," printed by the Fertile Chemical Co. for its agents:

Theory of Lime-Fertile

"It is generally agreed that there are thirteen elements necessary for plant life. Four of these are gases: Hydrogen, Nitrogent, Oxygen and Chlorine. Five are metals; Potassium, Magnesium, Calcium, Iron and Sodium. Four are non-metallic solids: Carbon, Sulphur, Phosphorous, and Silicon. Two of the gases (Hydrogen and Oxygen) and one of the non-metallic solids (Carbon) make up the bulk of the plant. They are obtainable from air and water. The other elements are obtainable from the soil when dissolved in water or moisture of some sort. A combined analysis of plants mixed together and dried is as follows:

Carbon	45.0 per cent, from the air only.
Oxygen	42.0 per cent, from both air and water.
Hydrogen	6.5 per cent, from water.
Nitrogen	1.5 per cent, from air and the soil.
Minerals	5.0 per cent, from the soil.
Total	100 per cent.

"From this you will see that less than 6.5 per cent of the elements contained in plants are obtained from the soil. This would seem to indicate that the soil is comparatively unimportant and that air and water, over which in general farming we have no control, are of far greater importance. It would lead to the belief that the small change which we can bring about in the plant by attention to the soil is comparatively unimportant. This is wrong. The soil is of the utmost importance. The plant can only derive nourishment from air and water in proportion to its size and strength which are first determined through the soil.

"The young plant obtains its first food from the seed with which it starts its roots, stems, and leaves. Roots and leaves begin immediately to gather food. The leaves gather carbon and oxygen from the air, the roots gather oxygen, hydrogen, potassium, phosphorus, iron, sulphur, calcium, magnesium, sodium and silicon. Most of these cannot be assimiliated by the roots except through the aid of moisture.

"For this reason the physical texture is of perhaps more importance than the chemical content of the soil. If for instance the soil is in such condition that water cannot penetrate or when it has penetrated cannot be retained, the roots are seriously hampered in obtaining the food which may be in the soil in large quantities.

"Also the plant foods in the soil must be made available through the medium of bacteria, some of which are peculiar to certain plants. The bacteria for legumes, for instance, have been classified and are well known. Bacterial life in the soil is essential and without it successful plant culture is impossible.

THAT autocracy as we face it today in Europe is organized Brigandry which denies the elemental rights of humanity, the right to live, the right to liberty, the right to the pursuit of happiness. Any man who proposes a compromise or a peace negotiation with this band of brigands is guilty of treason to the kingdom of liberty.—Dr. Lyman Abbott.

Why the Bacteria Are Important

"When in the last century it was pointed out that the plant in growing apparently exhausted certain chemicals in the soil, notably nitrogen, phosphorous, and potash, it was supposed that replacing these chemicals in the soil in substantially the same amounts in which the growing plant exhausted them, would maintain soil fertility and solve the question for all time. This discovery was historical, not so much for its value in itself, for the deductions made from it were soon disproved, but because it opened up a line of investigation which proved to be of tremendous importance. Analysis of the crops as they were grown showed they contained more nitrogen, phosphorus and potash than was known to be present in the soil. This was at first explained on the theory that these three elements were in the soil but were unavailable under certain conditions. It was found too that bacteria peculiar to certain leguminous plants had the ability to fix the nitrogen which the plant obtained from the air in the plant roots for the benefit of the plant and the soil. The nodules containing this nitrogen are easily discoverable on various kinds of clover, alfalfa, cow peas and other leguminous plants. Further study of bacterial life led to further and more important discoveries. It was found that the bacteria worked on the humus in the soil and in fact that all new growth was a process of making available the remains of old growth through the agency of bacteria. The rotting of manure, the building of a compost pile and the use of either or both on the soil is predicated, whether consciously or unconsciously, upon the theory of bacterial action. By these means bacteria are added to the soil and humus is added.

"Lime-Fertile was first used for inoculation of the soil for alfalfa and other legumes: Two methods had been used prior to the introduction of Lime-Fertile. One employs bacteria grown in the laboratory, and therefore pure bred, and free of any soil diseases. These are mixed with the seed at planting. By the other method inoculated soil, that is, soil in which the desired legume has been grown successfully, is transferred to the new field and the inoculation is accomplished by actual mixture. By the first method a thorough distribution is not always secured and the bacteria are more likely to deteriorate through exposure to the sunlight. By the second method thorough distribution is secured, but the bacteria are not necessarily pure bred, and there is always the chance of the transfer of soil diseases. The labor involved by the second method is considerably greater. In both methods the soil must be sweet in order to insure successful inoculation.

"In order to combine the two preferred methods in their best points, experiments were begun with the inoculation of lime or limestone and of untreated prosphate rock. At first these experiments were made only for inoculation of alfalfa. Then an all crop strain of bacteria was used for the inoculation of the ground rock and in comparison with the specific inoculation for alfalfa by the treatment of the seed and by the transfer of soil plus lime at the usual rate per acre. Then experiments were tried on other things besides alfalfa and clover and legumes—on vegetables of all kinds, on corn, on potatoes, and in some cases these experiments were conducted in direct competition with commercial fertilizer of varying analysis plus lime or limestone. The results of these experiments were uniformly favorable to Lime-Fertile and it was then proposed to market Lime-Fertile, as the new material was called, and to secure the widest number of users by selling Lime-Fertile to them on an experimental basis.'"

Phosphate Rock Industry of the U.S.

Summary of Practice of Quarrying and Mining Deposits of One of the Most Valuable Non-Metalic Minerals*

By R. W. Stone,
U. S. Geological Survey.

PHOSPHATE ROCK is a sedimentary deposit containing phosphate of lime. It occurs as a hard rock, like limestone; as pebbles in stream deposits; and as a residuum from the decomposition of phosphatic limestone, dolomite, and other rocks containing phosphate. The method of mining it depends on the character of the deposit.

Phosphate rock is finely ground and used directly as fertilizer, and as an ingredient of artificial fertilizers. It is also the source of phosphorus, which is used in matches, medicine and vermin pastes, as an alloy with bronze and other metals, and to make smoke screens in trench warfare and at sea.

Phosphate rock occurs in commercial quantity in several countries in both the Eastern and Western hemispheres. Deposits in the United States are the largest in the world, and those in Algeria and Tunis probably rank second in size. The annual production in the United States has been approximately one-half the world's production.

The principal prosphate deposits of the United States are in Florida, South Carolina, Tennessee, Montana, Idaho, Utah, and Wyoming. The following description gives the general mining practice in each of the principal phosphate producing States.

FLORIDA

Florida is the largest producer of phosphate rock in the United States. Four classes of phosphate have been marketed—hard rock, land pebble, river pebble, and soft phosphate. The land-pebble industry is most important, and hard rock ranks second. Phosphate-mining in Florida began in 1888 with the extraction of river pebble, but this type of deposit was depleted in 20 years and river pebble mining practically ceased in 1908. Hard rock and land pebble deposits were developed by 1890. Marketing of soft phosphate is a development of recent years. Both hard rock and land pebble deposits are worked by open pits, but not by the same method. As is to be expected, there are differences in method of extracting the same type of deposit at different pits. Only the general processes can be given here.

Removing the overburden of sand and clay from hard rock phosphate deposits is done in various ways, as by horsepower scrapers, steam shovel, and hydraulicing. Mining of the phosphate, which overlies an irregular limestone surface, is done by pick and shovel, or by a steam shovel, where the deposit is above the level of ground water. The rock is sent to the washer by wagon, cable tram car, or by dinky train. Some of the valuable deposits of hard rock are so deep that they lie below ground water level and the volume of water entering the pits is so great that it cannot be kept down by pumping. The phosphate, therefore, is dug by large dredges. By this method it follows that a considerable amount of worthless material is raised, but it is disposed of by washing. The material brought up by the dredge is loaded on small cars which are drawn up inclined railways by cable and sent to the washer.

In preparation for mining land pebble phosphate from a large area, the overburden of sand is stripped by steam shovels or by hydraulic giant. The steam shovel is used where the sand is partly indurated or carries hard lumps that could not be handled by the other method. The shovels load into small cars on a temporary track which are hauled to the waste dump. In hydraulicing, the overburden is washed into a sump from which it is raised by centrifugal pumps and flushed through troughs or pipes to a waste dump. When stripping is completed the land pebble phosphate at most of the mines is loosened by a hydraulic giant and washed into a depression from which it is raised by powerful sand pumps in the same manner as the stripping. The phosphate rock pumped out of the pit is conveyed to the washer through pipes. Of course there are mines where the land pebble is dug by hand or by shovel or mechanical scoop, but hydraulicing gives the largest return for the least labor. It is by these methods that Florida produces over two million tons of phosphate rock annually.

Mining phosphate by hydraulic method, Mt. Pleasant, Tenn.; photos by Phalen, United States Geological Survey

SOUTH CAROLINA

Phosphate rock mining has been continuous in South Carolina since 1868. The field lies near Charleston, and the location and extent of the workable deposits are well known. There are two kinds of deposits—land rock and river rock. The land rock occurs in a more or less irregular and cavernous bed usually 8 to 16 in. thick and lying several feet below the surface. River rock is loose and rounded nodular material accumulated and concentrated on the river bottom. The river deposits are mostly exhausted.

When the industry was new, land rock was mined by hand, and 6 ft. of overburden was about all that could profitably be taken off by negro labor to recover the

*Published with permission of the Director of U. S. Geological Surey.

few inches of phosphate available. In recent years hand labor has largely given place to more efficient methods. By the use of machinery, as much as 22 ft. of overburden is removed. Land rock mining is done by steam shovel. In working a tract a steam shovel or dredge makes a cut about 20 ft. wide down to the phosphate bed. The dirt is piled on one bank of the cut and a light movable railroad is laid on the other bank. A second steam shovel tears up the rock and loads it on flat cars running on the track above. Another method is to break the rock with picks and load it by hand in buckets raised by a hoist moving on the same track as the cars. When the phosphate has been removed from the cut, the track is moved back, and the cut is widened by digging on one bank only. The dirt from the new cut is dumped into the strip from which the phosphate rock has been taken.

River rock mining practically ceased about 1894 when the best deposits were exhausted. When first exploited, river rock was dug by hand where it was uncovered between high and low tide. In deeper water it was lifted with oyster tongs into small boats, and even was brought up by divers. The shallow water deposits were soon worked out and deposits in deep water were attacked by steam dredges. The dredges were of the clam-shell type and worked at depths from 20 to 50 ft.

Phosphate-mining was done in South Carolina by five companies in 1870, 16 companies in 1884, 22 in 1891, and is continued at the present by only two companies. South Carolina furnished 1.3 per cent of the total quantity of phosphate rock sold in the United States in 1917. The output of the State has fallen steadily from about 180,000 long tons in 1910 to less than 35,000 tons in 1917.

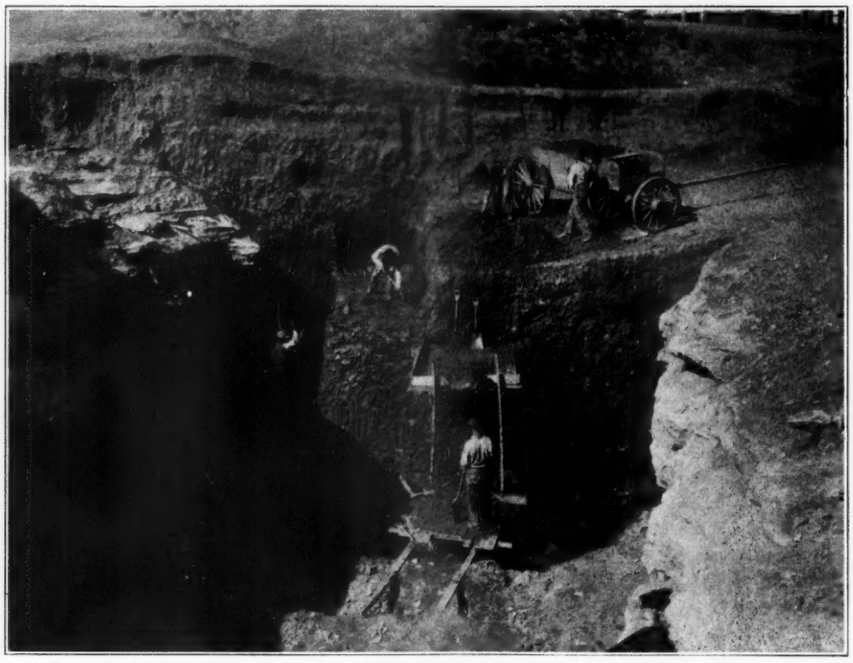
TENNESSEE

Phosphate rock was discovered in Tennessee in 1892 and production, which began at once, has been continuous. Practically all of the phosphate mined in Tennessee is either blue rock or brown rock. Brown-rock phosphate is a secondary deposit derived from phosphatic limestone. It occurs in plates of varying and irregular thickness and the beds are found in bands where the horizontal phosphatic limestone outcrops around a hillslope, and also in blanket deposit in more nearly level areas.

Brown-rock phosphate is overlain by clay which is removed by various methods. The horse-drawn scraper, steam shovel, drag-line excavator, and hydraulic giant are used, the choice depending on the thickness of the overburden and the area to be stripped. Probably the greater part of the brown-rock is mined by hand labor. It occurs in irregular channels on the very uneven surface of an underlying limestone. The narrow, deep channels in the limestone make hand-mining the only practicable method in many places. The rock is dug by pick and shovel, and thrown to the banks of the cut where it is loaded on wagons or small cars for delivery to the washing plant. The depth of the channels in some places necessitates intermediate shoveling platforms. Steam shovels cannot be used with the greatest success, but hydraulicing is an efficient method where it can be employed. At one plant the overburden is stripped by a drag-line excavator and the phosphate is taken up by hand labor and loaded into buckets operated by a long cantilever. Here the rock is loaded into small cars running on a track along the edge of the excavation, and the cars are hauled to the washing plant by a small locomotive. Of course, where the rock is mined by hydraulicing it has to be raised from the sump by a pump or dredge, and is carried to the washer through a pipe.

Blue-rock phosphate is a hard rock resembling limestone and occurring in a bed from a few inches up to 4 feet thick. Where it is found outcropping around the face of a hill the first recovery is made by stripping the overburden, and blasting the rock. It can then be raised by steam shovel and loaded on tram cars for delivery

Mining brown-rock phosphate from depth channels in limestone



Deep channels for brown-rock phosphate, Mt. Pleasant, Tenn.

to the crusher. When a cut has been made so far into the hillside that the overburden is excessive, then underground mining is resorted to, as on any flat-lying hard rock deposit. Tunnels are driven in and rooms are cut on each side at right angles to the tunnel, and regularly spaced. This is known as the room-and-pillar method of mining, for between the rooms a pillar of almost the same size as the rooms is left to support the roof. When the tract has been completely mined by this method the pillars may be drawn or mined out, and the roof allowed to cave. In underground mining, holes are drilled in the rock, which is then blasted down with powder, and the broken material is taken out of the mine on small cars. The method is the same as mining a flat coal bed.

Tennessee produced over 500,000 tons of phosphate rock in 1917, although the industry was hampered by shortage of cars and labor.

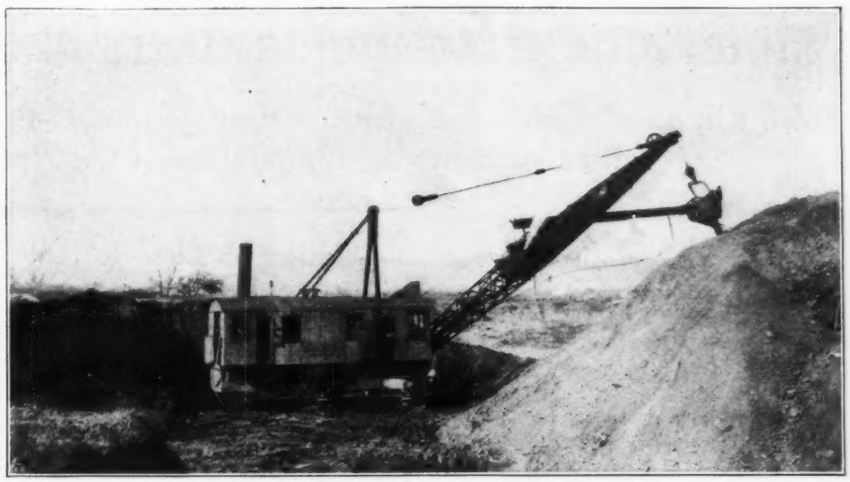
WESTERN STATES

Phosphate rock occurs in billions of tons in the mountains from near Helena, Montana, to Salt Lake City, Utah. It is a hard, black to gray rock of oolitic texture interbedded with limestone, shale, and quartzite.

The western phosphate field made its first small production from Idaho in 1906. The growth of the industry has been slow because of high freight rates to the Pacific Coast and Mississippi Valley, and lack of demand for fertilizer on the newly broken land of the Rocky Mountain States. The production was 15,000 tons in 1917, made by two companies in Idaho, one in Utah, and one in Wyoming. The rock is shipped to California for manufacture into fertilizer. Phosphate has not been mined in Montana as yet, although the deposits are extensive and high grade.

The formation in which the phosphate occurs has been upturned and folded in the mountain making processes, and the phosphate bed almost everywhere dips at a steep angle. The first mining of phosphate rock near Montpelier, Idaho, where the bed dips steeply with the slope of the hill, was done by blasting from the ledge and rolling the rock down the incline to a stock pile. It was loaded into wagons and hauled to the railroad for shipment to the Pacific Coast, where it was used for making superphosphate. This simple method of mining, however, is not applicable for long. With further development and increased production from a steeply dipping bed, underground mining is employed.

The phosphate bed at the Waterloo mine near Montpelier, Idaho, is 5 ft. thick and dips at about 30 deg. from horizontal. Extraction of the rock was begun by an open cut, and quarrying covered an area about 200 ft. square. Then tunnels were driven below the quarry to cut the bed well below the surface. According to a personal letter from W. F. Kett, of San Francisco Chemical Co., the development consists of cross-cut tunnels to the deposit, then drifts along its course. Raises are run from the drifts 100 to 150 ft. apart. Small pillars are left to protect the raises, and the ground between them is stoped. The raises are equipped with steel-bottomed chutes and the ore goes by gravity from the face of the stope down the chutes to mine cars in the drifts. The stopes are drawn clean, propped with heavy timbers, and left to cave. The pillars along the raises are robbed last. The rock is not very hard and drilling is done with geared coal augers worked by hand. This method removes practically all of the phosphate rock, and its movement from working face to stock bins is by gravity.



Stripping rock-phosphate deposit, Mt. Pleasant, Tenn.

Underground mining is employed at Paris, Idaho, to extract the phosphate rock which occurs in a steeply dipping bed striking north-south. Where the phosphate crosses the deep valley of Paris Creek a crosscut tunnel has been driven. According to a letter from Lewis A. Jeffs, president of the Western Phosphate Mining & Manufacturing Co., the crosscut reaches the bed at about 90 ft. from the portal, with approximately 50 ft. of stoping ground overhead at this point. A drift follows the bed for approximately 600 ft. in a southerly direction, and in August, 1918, was advancing about 5 ft. per day. The drift gains about 25 ft. of backs or stoping ground for every 100 ft. run along the bed. Raises and chutes are put in along the drift and the ore is stoped in the usual manner. The mine is equipped with air compressor and air drills.

The phosphate bed mined near Randolph, Utah, is 4 to 6 ft. thick, but is divided into two parts by a lean layer 2 to 7 in. thick, which separates about a foot of the high-grade ore at the bottom of the bed from the upper part. The dip of the bed is 50 degrees. A main cross-cut tunnel is driven to the bed and a drift turned along it both ways. Raises are put up from the drift and the ore stoped down. The upper bench is taken out first and the chutes and entries are cleared. Then the lean parting is mined out and put in the waste dump. When the entries have been cleaned again the lower bench is mined. The drift and stope is advanced again on the upper part of the bed, and the operation repeated. The rock is drilled by hand, blasted, and falls down the stopes into chutes at the bottom of the raises. It is trammed out of the mine in small cars running on a light track.

At Cokeville, Wyoming, tunnels have been driven at different levels on the strike of the bed which dips at a high angle. Overhead stopes have been opened through upraises from the drifts. The stopes are timbered and the ore settles between the timbers and is drawn through chutes into mine cars and dumped into the lower stopes. From the stopes above the lowest tunnel, the rock is dropped into cars and trammed out to bunkers from which wagons are loaded for hauling to the railroad. The rock is hard and air drills are used.

Western phosphate rock is clean and does not have to be washed. It goes direct from the mine to shipment and needs only to be crushed before being treated.

BUY LIBERTY BONDS

This Marble Quarry Receives $500,000 Order

GOUVERNEUR, N. Y.—John J. Sullivan, owner of the Ryalstone & Sullivan quarries here, today closed a contract with the Aluminum Company of America for a half million dollars' worth of stone for the proposed dam in the St. Lawrence. The deal is the largest marble contract here in many years.

Mr. Sullivan is to furnish 40,000 tons of stone ranging in sizes from one and two men stone to 40 ton blocks. The stone will be obtained by blasting.

Six cars of ties and rails were used to lay spurs to the quarries and sidings for loading. Locomotive cranes and electric derricks will be used in loading.

Mr. Sullivan has leased the Grove hotel on the west side for quartering his employes and will maintain his own commissary and employment bureau.

Limestone Producers Fertilizer Manufacturers

Since Lime and Limestone Are the Foundation of Soil Fertility, Why Not Lime and Limestone the Foundation of the Fertilizer Industry?

AGRICULTURAL LIME and limestone are not on the "Preferred List of Essentials, No. 2." Fertilizers are. Lime and limestone are fertilizers, but not "complete fertilizers," i. e., they do not contain all the necessary elements of plant food.

"Complete fertilizers" and "commercial fertilizers" are generally synonymous terms since the manufacturers of the latter have defined the former. Since the war it is doubtful if some of the commercial fertilizers are really complete fertilizers, according to the fertilizer manufacturers' own definitions, for nearly all commercial fertilizers have been short in potash.

Many State Agricultural authorities are now urging farmers to buy the concentrated ingredients and make their own fertilizers instead of paying freight and fertilizer prices on "fillers" which generally compose 50 per cent or more of commercial fertilizers. Now farmers are conservative and while the logic of these arguments make the issue inevitable, the use of fertilizers and the sale of limestone and lime could be tremendously aided by progressive limestone producers.

Why shouldn't they buy the raw materials and make fertilizers, since their own product is the accepted foundation of all soil fertility? Just to show how this could be done the following quotations are taken from a circular of the North Carolina Department of Agriculture on "Lime Facts for Landowners."

"Ground limestone should always be mixed with acid phosphate for the double purpose of substituting the limestone for potash in the fertilizer formula and for preventing the immediate formation in the soil of the insoluble phosphates of iron and aluminum. Below are given a few fertilizer formulas that have proved highly satisfactory for the crops named. The ingredients should be applied to the soil soon after mixing.

Fertilizer Formula for Small Grain

1,000 pounds of ground limestone,
600 pounds of 16-per-cent acid phosphate, and
400 pounds of cotton-seed meal or fish scrap.

Fertilizer Formula for Cotton and Corn

1,000 pounds of ground limestone,
600 pounds of 16-per-cent acid phosphate, and
400 pounds of cotton-seed meal or some other ammoniated goods carrying an equal amount of nitrogen.

Fertilizer Formula for Tobacco

1,000 pounds of ground limestone,
600 pounds of 16-per-cent acid phosphate,
350 pounds of cotton-seed meal, and
50 pounds of nitrate of soda.

"Any other material carrying an equal amount of nitrogen may be substituted for the cotton-seed meal, such as dried blood, fish scrap, and so on.

Fertilizer Formula for Peanuts

1,000 pounds of ground limestone,
650 pounds of 16-per-cent acid phosphate,
300 pounds of cotton-seed meal, and
50 pounds of nitrate of soda.

"The cotton-seed meal may be replaced by any other material carrying an equal amount of available nitrogen.

Fertilizer Formula for Sweet Potatoes

1,000 pounds of ground limestone,
500 pounds of 16-per-cent acid phosphate, and
500 pounds of cotton-seed meal.

"Any other material carrying an equal amount of nitrogen may be substituted for the cotton-seed meal, such as dried blood, fish scrap, and so on.

Fertilizer Formula for Irish Potatoes

600 pounds of ground limestone,
500 pounds of 16-per-cent acid phosphate,
700 pounds of cotton-seed meal, and
200 pounds of nitrate of soda.

"Any other material carrying an equal amount of available nitrogen may be substituted for the cotton-seed meal, such as dried blood, fish scrap, and so on.

It will be noted that ground limestone forms the basis of all these fertilizers—in all except the last formula it forms 50 per cent of the material. If the other materials were used in more concentrated forms the proportion would be much greater.

Relation of Lime to Soil Fertility

IN THE DECOMPOSITION OF HUMUS by bacteria in the soil, nitric acid is formed. The presence of any considerable amount of free nitric or other acid in the soil moisture checks, and finally arrests completely, further formation of nitric acid from the humus. But when there is present an abundance of lime carbonate, associated, at the same time, with other conditions favorable for nitrification, the lime of the lime carbonate is appropriated by the nitric acid formed, setting free the carbonic acid and leaving, in place of the lime carbonate, lime nitrate, which is the chief compound from which agricultural crops derive their supply of nitrogen. In this neutraliaation of the nitric acid by the lime the soil is prevented from becoming sour, and nitrification goes forward continuously at a rapid rate. At the same time that the nitirc acid is passing from the organism, which excretes it as a waste product, to the lime of the lime carbonate to become neutralized, this free nitric acid and the carbonic acid, too, in its turn, when it is set free from the lime by the nitric acid, act together in increasing the dissolving power of the soil moisture for the other essential plant-food elements in the soil. Thus it is seen that carbonate of lime not only takes a necessary part in putting the nitrogen of humus in food form to supply crops, but it also aids in bringing other plant-food elements into available form as well, and it is a common experience that soils comparatively poor in potash and phosphoric acid, if only the humus and lime content are kept high, may yet produce large yields, because the same action which develops from the humus the lime nitrate, sets free in the soil moisture more potash and more phosphoric acid. This is why an abundance of lime carbonate in the soil is generally associated with high productiveness. —Bulletin 245 of the North Carolina Department of Agriculture.

The Liberty Loan Arms Our Soldiers

THE SUBSCRIBERS to the Liberty Loans have purchased for the War Department over $4,000,000,000 of ordnance—$1,000,000,000 was spent for artillery; $300,000,000 for automatic rifles; $100,000,000 for small arms; nearly $2,000,000,000 for artillery ammunition and $340,000,000 for small arms ammunition; $100,000,000 was spent for armored motor cars.

It is estimated that $7,000,000,000 will be spent by the Ordnance Department this current year.

Every American wishes to have a part in winning the war and supporting our soldiers who are fighting our battles in France. Every subscriber to the Fourth Liberty Loan will have a part in the great achievements that the American Army is accomplishing, and in the achievements which the greater American Army will accomplish next spring.

Work on the Indiana Portland Cement Co. Plant at Greencastle Progresses

Will Have Several Unique Features—240-Ft. Kiln, Special Provisions for Handling Bulk Cement—Packing Plant Eliminated

ADAM L. BECK and associates, who some time ago sold their interests in the Oklahoma Portland Cement Co. at Ada, Okla., are busy completing a new plant at Limedale, near Greencastle, Ind., which it is expected will be a model in every detail. The construction work is progressing favorably despite the many handicaps brought about by war conditions. Practically one hundred per cent of the machinery has been delivered and ninety per cent of the construction material with the possible exception of the cement and other more easily obtained products. The concrete construction work is about 60 per cent completed.

One hundred percent of the machinery is bought and delivered

Some of the special features of the plant are reinforced concrete and steel construction throughout; storage of all raw materials under one roof; under-water storage for coal; a 240-ft. kiln; provision for a potash-recovery system; clinker cooler and conveyor to storage bin combined; elimination of a special packing plant by filling bags direct from cement-storage bins by a unique bagging machine on wheels; elevated cement-storage bins for loading box cars with bulk cement by gravity flow.

The plant will have an initial capacity of 1,500 barrels per day. It will be electrically driven throughout. Each unit will have its own motor, making over 50 in all.

Excellent Transportation Facilities

The new plant will have railway connections with the Pennsylvania, Monon and Big Four railways. Coal is brought from the mines only eight miles distant. The stripping removed in these mining operations is shale, which can be put down at the cement plant at slight expense. The property on which the plant is built includes a deposit of clay and a limestone quarry, which will be used for about 50 per cent of the raw materials required. Spauls from the Bedford cut-stone quarries to the south will also be brought to the plant.

All the raw material will be brought in on an elevated track in hopper bottom cars. A No. 20 gyratory crusher is located in one end of the raw materials storage house. The bins for all the raw materials are being constructed of reinforced concrete. The coal storage bin will have a capacity of 3,100 tons and will be arranged so as to keep the coal entirely submerged in water. The storage for coal, shale, clinker, gypsum and limestone is all under one roof in a building 80 by 336 ft. A traveling crane will take the raw materials from the bins to the receiving hoppers of conveyors in underground tunnels.

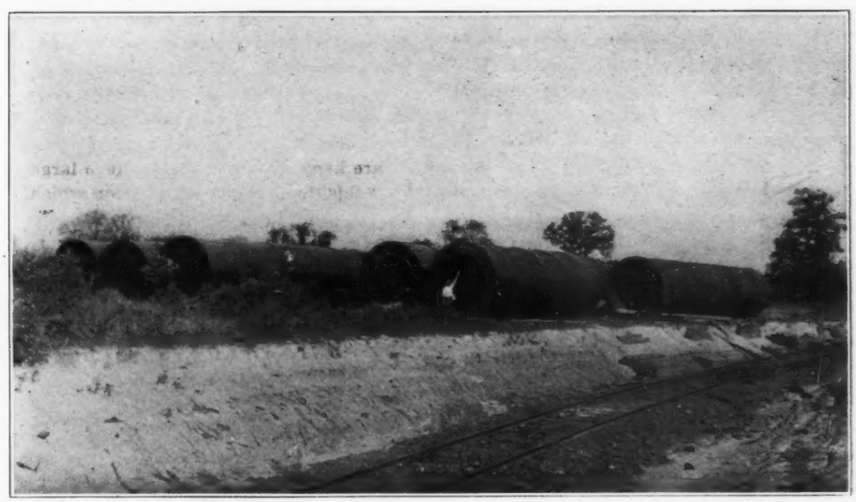
Grinding and Kiln Plant

The wet process of cement manufacture will be used. Kominuters are to be used for the grinding of the raw materials. Pulverized coal will be used for fuel. The building containing this grinding machinery, the concrete slurry tank, the 240-ft. kiln and the tube mills is 80 by 330 ft., and is parallel to and adjoins the raw material plant.

The most interesting feature here, of course, is the 240-ft kiln, one of the largest ever built. The shell is 10 ft. inside diameter made of ¾ in. open-hearth steel plate. The shell was shipped in four sections. It has an interesting history, being one of three designed and built by the Power & Mining Machinery Co., for the Canada Portland Cement Co. plant at Moose Jaw, Sask. These kilns were never erected in Canada.

Kiln Details

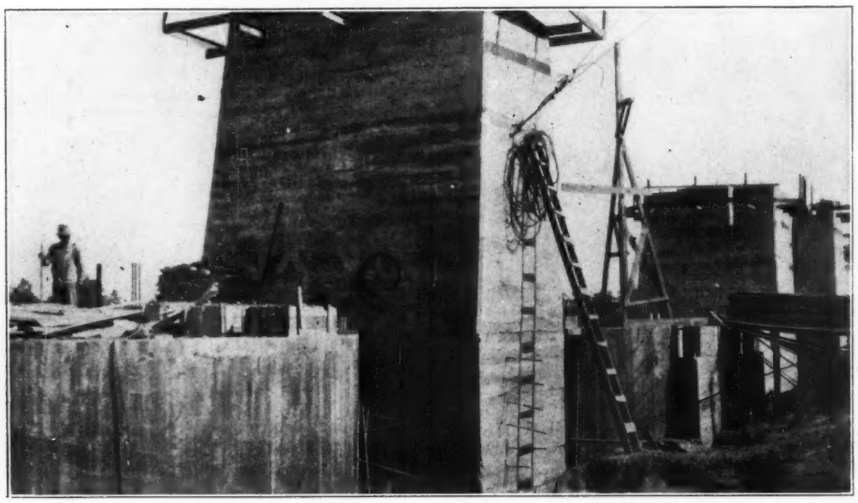
The riding rings are four in number, 13 ft. in diameter with 18 in. face of hard cast steel. The roller frames are extra heavy box sections. Each frame has two cradles, each of which will carry two rollers. The bearing castings are held in posi-



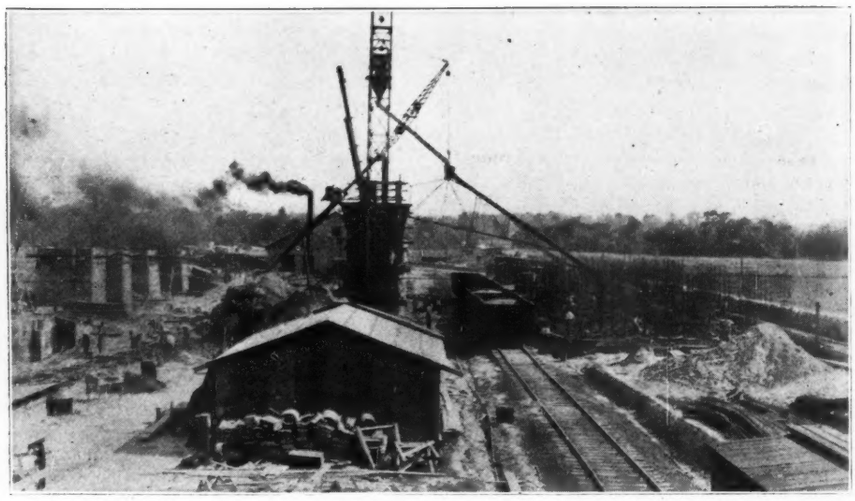
Record size cement kiln—240 ft. long, 10 ft. in diameter

Construction Views, Indiana Portland Cement Co.

Approach track to raw material storage bins—water-supply pond on left



Slurry tank in foreground; bases for 240-ft. kiln—concrete and reinforced concrete construction throughout plant



Kiln foundations on left—raw material storage bins on right—view taken about Sept. 1

tion laterally by two continuous tie rods 3½ in. in diameter.

Each cradle is fitted with four phosphor bronze half shells for the roller journals. The journal bearings are water-jacketed and are arranged for calypsol grease lubrication and are fitted with tight caps or plugs at the outer ends. The upper half of the inside end of the bearing will be closed by means of a wood filler such as is used on railway car journals, in order to prevent the grease from working out.

The rollers are 30-in. in diameter with a 21-in. face on 1⅛-in. shafts. The inclined thrust of the kiln will be taken by two sets of 30 by 4-in. rollers made of high carbon steel.

The driving gear will consist of four trains which will have a ratio of 1 to 210. The inclination of the kiln will be ⅜ in. to 1 ft. and the speed will be one revolution per minute. The feed end of the kiln is provided with three rows of lifting shelves beginning 4 ft. from the feed and extending 36 ft. They are in approximate 4-ft. sections and are bolted alternately or staggered to form nine interrupted rows. All these shelves project about 18 in. and have a lip on the interior of about 3 in.

The slurry is pumped into the feed end of the kiln. The conveyor for the clinker to the clinker-storage bin is designed to cool the material in transit. The hot air is exhausted by a fan and is used in the kiln and coal dryer. There is storage capacity for 50,000 barrels of clinker.

No Packing Plant

From the tube mills the cement is delivered to reinforced-concrete cement storage bins or silos in an adjoining building. Two of these silos have a capacity of 20,000 barrels each and four have a capacity of 500 barrels each, making 60,000 barrels in all. These silos are elevated to provide a bagging and shipping room under them.

Each bin is provided with a number of bottom openings from which the cement can be drawn direct into a bagging machine, thus dispensing with a special packing plant. The unique feature of this installation is the bagging machine, which is of the quadruple type and is mounted on an electrically propelled railway truck. This machine can be centered under any bin opening and a tight connection simply and easily made.

The shipping room is provided with railway tracks on either side. The cement silos are sufficiently elevated so that cement can be spouted from them direct to box cars, in cases of bulk loading. Incidentally all the cement Mr. Beck is using in his construction work is shipped and handled in bulk and he is an enthusiast for this method.

Designers and Builders

The Indiana Portland Cement Co. plant was designed by the F. L. Smidth Co., engineers, New York City. The cement company officers are Adam L. Beck, president; Peter Martin, vice-president; Marshall

Beck, treasurer; W. H. Hart, secretary; and W. S. Creveling, superintendent. The brand will be known as the "Hoosier."

Mr. Beck is a native of the Hoosier state. His father was a lime manufacturer and the family home at Huntington, Ind., is within a few miles of the new plant. Peter Martin is a lime manufacturer, who has recently completed a new plant at Logansport, Ind. Mr. Creveling was chief chemist of Mr. Beck's former cement plant at Ada, Okla.

BUY LIBERTY BONDS

Cement Exportation Greater Than in Year 1914

WASHINGTON, D. C.—While the war has unfavorably affected the exports of a large number of commodities, it appears to have increased greatly the shipments of cement. According to statistics now being compiled by the Department of Commerce, our shipments of this article during the fiscal year 1918, ended June 30, were over $2,000,000 greater than those of the fiscal year 1914, the last pre-war year.

During the fiscal year 1914, which closed just before the outbreak of the war, this country exported 2,391,453 bbls. of cement, valued at $3,382,282. The following year, 1915, showed a very slight depression, the total being 2,361,451 bbls., with a value of $3,241,686, but in 1916 this loss was more than made up, shipments aggregating 2,740,536 bbls., worth $3,776,564. In 1917 the quantity exported fell of nearly 400,000 bbls., totaling only 2,345,952 bbls., but this was more than offset by increased market prices, the value of the year's shipments being $4,111,550. During the fiscal year 1918 the quantity increased to 2,575,205 bbls., but far greater strides were made in the value, the exports being worth $5,989,081.

Our imports of cement, however, appear to have suffered considerably by the war. During the year 1914, Roman, Portland and other hydraulic cement imported reached a total of 36,414,100 lbs., valued at $160,737. This decreased the following year to 34,733,400 lbs., with a value of $131,764. In 1916 the full effects of the war were felt, our imports amounting to but 1,999,700 lbs., worth $9,182, and this total was further decreased, in 1917, to 403,600 lbs., valued at $2,929. A slight reaction has since set in, and imports for the fiscal year 1918 crept up to 842,600 lbs., worth $6,020.

In addition to hydraulic, a considerable amount of other cement is now imported. Prior to July 1, 1916, the importations of this cement were so small that no individual record was kept, but during the fiscal year 1917 the importations amounted to $17,857, and this increased in 1918 to $30,682.

BUY LIBERTY BONDS

Cement Production in 1917

WASHINGTON, D. C.—Statistics of the cement industry in the United States in 1917 prepared under the direction of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior, indicate that the total shipments of Portland cement from the mills amounted to 90,703,474 bbls., valued in bulk at the mills at $122,775,088. This represents a decrease in quantity of 4.1 per cent and an increase in value of 17.8 per cent compared with 1916. The combined shipments of natural and puzzolan cements in 1917 were 639,456 bbls., valued at $435,370, representing a decrease in quantity of 24.1 per cent and an increase in value of 1.0 per cent compared with 1916. The production of Portland cement in 1917 was 92,814,202 bbls., compared with 91,521,198 bbls. in 1916, an increase of 1.4 per cent. This production holds the record, the next highest output, 92,097,131 bbls., having been made in 1913.

Not only was the largest output of Portland cement made in 1917 but the factory price received during the year throughout the country was high, ranging from $1.22 per bbl. in the Lehigh district to $1.69 in the State of Washington, and averaging for the whole country $1.354, as compared with $1.103 in 1916.

The exports of hydraulic cement from the United States in 1917 were 2,586,215 bbls., valued at $5,328,536, or $2.06 per bbl., compared with 2,563,976 bbls., valued at $3,828,231, or $1.49 per bbl. in 1916. The imports for consumption in 1917 were 2,323 bbls., compared with 1,836 bbls. in 1916. The statistics of exports and imports were compiled from records of the Bureau of Foreign and Domestic Commerce.

Motor Trucks for Agricultural Limestone Shipments

Marble Cliff Quarries Co., Columbus, Ohio, Proves Feasibility of Motor Trucks for Shipments Up to Fifteen Miles

MANY opinions have been expressed as to the feasibility of using motor trucks for shorthaul shipments of cheap bulk commodities like agricultural ground limestone. The car shortage and the increase in freight rates make the use of motor trucks desirable wherever it is economically possible to use them. At least one progressive agricultural limestone producer has proved to his own satisfaction that motor truck deliveries up to 15 miles are both possible but economical.

K. H. Minneman, manager of the ground limestone department of the Marble Cliff Quarries Co., Columbus, Ohio, has kindly furnished the following facts in regard to what his company has already accomplished. This company has been using motor trucks for shipping agricultural limestone since spring. Mr. Minneman states:

"The cost of the service varies from 18 cents per ton mile for each of the first five miles to 17 cents per ton mile for each of the second five miles, and 16 cents for each additional mile over ten.

"The hauling is done by a motor truck company, but it may be that later on we will use our own trucks for the purpose.

"The limit of the haul depends, of course, upon the customer's location. If he is located several miles from the nearest railroad station it is more convenient for him to have the material hauled direct from the quarry to his farm than to have it shipped by rail and then hauled to his farm. Generally the length of the haul varies from three to fifteen miles one way.

"The stone is generally delivered in bulk; although there is no reason why sacked material could not be hauled in the same way.

"The results which we are obtaining are very satisfactory. We find that in view of the shortage of labor on the farms we are able to interest many farmers in using from ten to fifty tons who would not bother with it if it were not delivered to them.

"We have recently extended our service by shipping the stone in railroad cars to shipping points around Columbus, and then furnishing men and trucks to truck the stone from the car to the customer's field. This allows us to extend our operations and give even better service."

BUY LIBERTY BONDS

Concrete Ship Builders

FOLLOWING is a list of Pacific Coast concerns interested or engaged in concrete boats, barge and ship construction:

San Francisco Shipbuilding Company, 310 California-st, San Francisco, Calif.

Great Western Concrete Shipbuilding Company, Vancouver, B. C.

Hewitt Dry Dock & Shipbuilding Company, Portland, Ore.

American Concrete Pipe & Shipbuilding Company, Tacoma, Wash.

Interocean Barge & Transport Company, Seattle, Wash.

Newport Beach Shipbuilding Corporation, Newport Beach, Calif.

Motor Ship Corporation, Martinez, Calif.

Hurley Mason Company, Portland, Ore.

Hull Construction Company, Spokane, Wash.

West Coast Shipbuilding Company, Everett, Wash.

Treiber & Sheel, Seattle, Wash.

Quebec Issues 1917 Report on Silica Rock and Sand

Increasing Demand for Silica—Its Occurrence in the Province

TORONTO, Can.—The Department of Mines, Province of Quebec, has just issued its report for 1917. The following on silica rock and sand appears in the report:

Silica Rock and Sand

There has lately been a very active demand for quartz rock and sands, of high grade, for various purposes. Inquiries at the Provincial Mines Branch, from industrialists during the year 1917 covered the following purposes: Quartz rock for the manufacture of ferro-silicon; pure sand for the manufacture of silicate of sodium; sand for glass making; rock or sand for the manufacture of carborundum.

We indicate hereunder the possible sources of material for these purposes in the province of Quebec. It may be mentioned that L. H. Cole, of the Federal Mines Branch, has for the last three years been making investigations and tests on this subject of sands and other sources of silica, and has gathered a great deal of data on the matter.

The Potsdam formation, which constitutes part of the Cambrian, appears to be the most plentiful source of high grade quartz in the Province. It consists mainly of sandstones of various degrees of purity, often compact and altered to quartzite. This formation is pretty widely distributed, and it occupies large areas in the counties of Beauharnois, Soulanges and Deux-Montagnes. Moreover, in the lower St. Lawrence region, in the counties of L'Islet, Kamouraska, Témiscouata, along the south shore, large patches of Cambrian quartzites have been exposed, mostly by denudation and erosion of the overlying strata. In the lower St. Lawrence region these Cambrian quartzites and sandstones, which rest on the Pre-Cambrian basement, have received the local name of Kamouraska formation. Many outcrops of these quartzites are indicated on the map of Mr. J. A. Dresser, accompanying his report entitled "Reconnaissance along N. T. R. Southern Quebec," issued by the Geological Survey, Ottawa.

Another source of pure silica sand is found in connection with the peculiar occurence of kaolin in Amherst township. The kaolin is in deposits in a ridge composed of quartzites, referred to the Grenville formation by Dr. M. E. Wilson of the Geological Survey. Part of this quartzite is massive and part has been shattered to a friable condition. It is white and pure, except for an admixture of kaolin, of varied proportion. This friable quartzite, after washing to eliminate the kaolin, which can be recovered, constitutes a silica sand, free from iron, suitable for glass making.

In Vaudreuil county, at Cascade Point, at the eastern end of the Soulanges Canal, a quarry has been in operation for several years in Potsdam sandstone, part of the stone being crushed and used for glass making. The contents in iron sometimes reaches 2 or even 3 per cent, but part of it is removed by washing, leaving a silica sand of fair quality. This quarry is located on lot 1 of the parish of St. Michel de Vaudreuil. It is operated by the Cascades Silica Products Co., 103 St. Francois Xavier-st, Montreal.

Another quarry, in a similar occurrence of sandstone is located at Mélocheville, in Beauharnois county. The rock is also crushed and washed. The Dominion Glass Company, of Montreal, have used comparatively large quantities of this material for the manufacture of common glass.

In 1917, the Stinson-Reeb Builders' Supply Co., of Montreal, opened a quarry of silica rock, on an occurrence of Potsdam sandstone on lots 126-130 of the parish of St. Canute, county of Two Mountains, near the town of St. Jérome. Several analyses of stone from this occurrence of Potsdam quartzite have given over 99 per cent of silica, while the iron oxide varies from .07 to .50 per cent.

As to the occurrences of Cambrian sandstone on the south shore of the St. Lawrence, below Quebec city, Mr. J. A. Dresser in his report on that region, says: "The quartzite is best exposed in the vicinity of the St. Lawrence river, especially near Kamouraska bay. It is often nearly white in color, and exceptionally free from iron rust or other stains. It is occasionally used for building stone, and an attempt to employ it for glass manufacture seems to have failed only from adverse market conditions at the time."

As confirmatory to these remarks it may be mentioned that the islands "Les Pélerins," off Pointe St. André, are in great part composed of this quartzite. A representative specimen collected by an officer of the Federal Mines Branch, was analyzed in the laboratory of the Provincial Government and gave silica: 98.86; iron peroxide, 0.26, phosphorus, 0.0003.

Mention has been made of the Grenville quartzite of Amherst township, which constitutes the walls and also part of the kaolin deposits of St. Remi. This quartzite is free from iron, and practically the only impurity it contains is kaolin, hydrous silicate of aluminum. This is a mechanical admixture; a process of washing it off has been elaborated and a pure sand is now being produced.

It may also be pertinent to mention that large exposures of a white Grenville quartzite occur in the township of Montauban, in the county of Portneuf, which have been described by Dr. Bancroft, in his report on geology of the zinc and lead deposits of that district. These deposits have not been examined from the standpoint of their industrial utilization, but they would seem to be worthy of an investigation.

Potash and Other Minerals Found in Dried-Up Canadian Lake

TORONTO, Can.—A discovery which will prove of untold value to the Allies has been made 30 miles north of Maple Creek, Saskatchewan, in an immense deposit of potash, sodium sulphate and Epsom salts. Experts assert this deposit consists of millions upon millions of tons of these minerals in their pure state.

It is claimed sufficient has been found to supply all requirements.

Only Three Feet of Muck

The deposit was discovered in the dried-up bed of an old lake and there is only from two to three feet of muck on top of the minerals so that the work of getting it out will not be hard.

The whole bed of the lake, which is two and one-half miles long and over one mile in width, has been staked and filed on. Work will at once be started in clearing away the top soil and erecting buildings for the carrying on of the development. The claims have been filed on by Saskatchewan men who will keep control although outside capital will be used in the development.

The professor in chemistry at the University of Saskatchewan at Saskatoon examined the minerals both on the ground and at the laboratories in Saskatoon and pronounced them perfect, while engineers have estimated the deposit at millions of tons. A branch line will run into the works from Maple Creek.

Major MacPherson, of the law firm of Buckles, Donald and MacPherson, is solicitor for the interests who have secured the claims.

Building Industries and War Work

How They Can Co-operate with the Government in Winning the War If Given the Chance

IN A COMMUNICATION of the War Service Committee of the National Federation of Building Industries addressed to Chairman Baruch, of the War Industries Board, many points of interest to every producer of building material are brought out, of which the following are examples:

War Duties of the Building Industries

Three principal duties under war conditions seem to devolve upon the building industries:

(a) Adequate resources in plant, material and service must be made promptly available for war needs.

(b) Plant and organization not now devoted to war work must be converted to war work to such extent as may be feasible and desirable.

(c) Labor, superintendence, plant and material, not now applied to war work, when not needed by the government should be kept employed meeting the construction needs of the civil population, maintaining the prosperity of those who might otherwise be idle and non-productive, thereby preserving the industry as a national facility.

The War Service Committee of the National Federation of Building Industries, speaking with authority for the whole industry, is prepared to undertake this work. Where trades within the Federation have their individual war service committees we are equipped to co-ordinate them if necessary for particular occasions. In trades which have no such committees we are prepared to undertake their formation or, if necessary, to carry on the required negotiations for such trades, provided no conflict between two or more building interests is involved.

Confusion of Authority

At the moment no less than six administrative governmental agencies exercise functions affecting building construction resources for war and civil purposes:

1. War Industries Board Priorities Committee.
2. War Industries Board, Resources and Conversion Section.
3. The Railroad Administration.
4. The Fuel Administration.
5. U. S. Employment Service of the Department of Labor.
6. Capital Issues Committee of the Federal Reserve Board.

The decisions of several or all of these agencies are part of one situation in most matters upon which the Federation would co-operate with the government. If a shipbuilding concern requires workingmen's dwellings, not only must the capital, transportation and labor be provided but material is also required, which in turn calls for the use of fuel. To co-ordinate all six authorities in one board for consideration of building policies would not only harmonize action and expedite execution, but through the consideration of the situation as a whole, might disclose pertinent aspects for dealing with which no means now exist.

The same policy with regard to civil construction is not always applicable in every community throughout the country at the same time. It might well be true that civil construction interfered with war work in one region when it would not in another and in a given region at one time and not at another.

It is doubtful if the readjustment of industry to direct war work, even if continued for several years, would ever result in a complete absence, throughout the United States, of surplus resources necessary for meeting in part, at least, the construction needs of the civil population. While some materials will probably not be available until peace returns, other materials exist in surplus. Lumber, for instance, is being cut in ship lengths, under such circumstances that there is an enormous new by-product of lengths suitable for building. Many sawmills burn refuse for fuel; others use waterpower. The same is true of many factories.

Transportation is a simpler problem in building materials than in many other lines because the average haul is short. This is due to the weight of the goods. The cost of long hauls is prohibitive. Every population center draws its construction commodities from a nearby region. Such material is usually carried in cars returning from a loaded trip, which cars would otherwise be empty. One of the most promising and urgent purposes which can be pursued through co-operation of the building industry with the government is the development of inland waterways, which are the natural highways for heavy freight for war-time use.

In most industries the conversion process to war work is gradual. Few who are not close to it realize how large a proportion of their neighbors are wholly or partly engaged in building. The number is so great that to hold any considerable part of them marking time would strain the strength of tradesmen, landlords and many others in every community of the country, weakening the people as tax payers, as bond buyers and as contributors to Red Cross and other relief funds.

Not the least important reason for sanctioning civil construction when, where, and if war needs permit, is that the national interest requires the preservation of the building industries as a national facility. Many think the country pursued for several decades a mistaken policy affecting the merchant marine, only to encounter at last the necessity of creating a fleet under pressure at the highest cost and taxing the money out of the incomes of the people. Many likewise think the country followed an erroneous course affecting railroads with a somewhat similar result. The people pay. It would seem to be to our national interest to do all such things compatible with war needs (which must always come first) to prevent the disintegration and complete breaking down of the building industry, in order that the necessary mechanism should constantly be available to give our people necessary housing facilities.

To the Members of the National Federation of Building Industries

THROUGH the good offices of President Wheeler of the Chamber of Commerce of the United States, an appointment was made with Hon. Bernard M. Baruch, Chairman of the War Industries Board, for a conference. Your Executive Board held a meeting at which a statement was prepared to be presented to Mr. Baruch.

The conference with Mr. Baruch resulted in his agreement to co-operate in arranging the further conference requested by your committee with responsible representatives of the six administrative governmental agencies referred to. Mr. Baruch's attitude was friendly and entirely frank. He went into some detail with your committee as to the present requirements of our Government and her Allies, pointing out that in his opinion the real test and strain ahead of us was one of national man power.

Your Committee is encouraged to believe that constructive progress has been made towards creating a proper point of contact between our industry and the government through this agency and you shall be advised of further developments as they occur.

Ernest T. Trigg, President.

NEW MACHINERY AND EQUIPMENT

New Gasoline Locomotive for Quarry Industries

A NEW standard-gage gasoline-engine-driven locomotive has been placed on the market by the Milwaukee Locomotive Manufacturing Co., Milwaukee, Wis. This company has long built industrial locomotives of from 10 to 50 h. p. in both narrow and standard gage models. The newest product, illustrated herewith, is 60 h. p. (delivered at rail) and weighs 25,000 lbs.

This locomotive is geared for two forward speeds—4.2 and 8.4 miles per hour—and one reverse speed, 4.2 miles per hour. The motor is a four-cycle, four-cylinder vertical type, running at 700 r. p. m. The drawbar pull on low gear is 5,400 lbs., and on high gear 2,700 lbs.

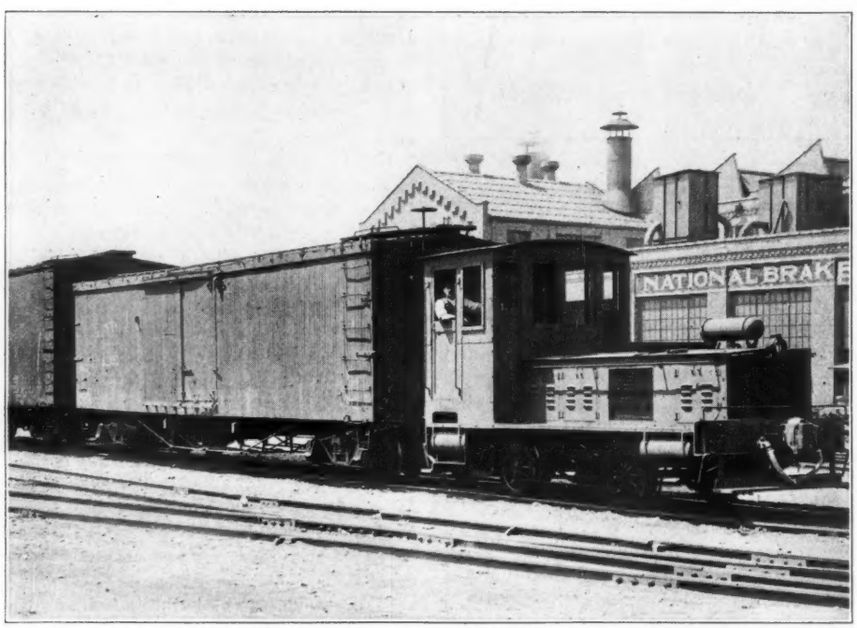
There is a chain drive from the transmission to the drive axle. The drive from wheel to wheel is by means of side rods, which apply power to all four wheels. The wheels are 30 in. outside diameter.

The length from face to face of bumpers is 219 in., the width 96 in., the height over the cab 132 in. and the wheel base 84 in.

The haulage capacity is stated to be as follows (in tons of 2,000 lbs.):

Grade	Level	1%	2%	3%	4%	5%	6%
Low gear.	167.5	95.5	64.5	47.5	36.5	29.	23.5
High gr..	77.5	41.5	26.	17.5	12.	8.	5.5

The type L locomotive of which this is the largest is especially designed to meet the severe requirements of the mining and quarry industry. The electrical equipment consists of a high-tension magneto, electric generator, storage battery and electric starter. Steel cabs are furnished with this locomotive if desired.



Twelve-and-a-half ton gasoline locomotive with electric starting, lighting and air-brake equipment

Don't Overload Your Motor Truck

H. P. BRANSTETTER of the KisselKar Co. contributes the following: "Overloading a motor truck not only results in excessive strains and a greatly accelerated rate of depreciation, but in unnecessary high maintenance cost.

"Overloading affects frame, springs, wheels, axles, tires, power-plant, and even the driving mechanism, and while the truck is designed with a certain factor of safety, this factor was intended merely for emergencies and not for continuous and continual abuse.

"Overloading means motor truck suicide. While it is true that the fatigue of steel is much slower than that of flesh tissues, the fatigue is there just the same.

"The first bad effect on the motor truck from overloading is that the springs are forced down to a flattened position. This practice, if kept up, reduces their flexibility, resulting in the springs losing their life and becoming inactive, like a solid bar of steel or iron.

"Greater tire wear is another result of overloading. The heavier the load, the harder the tires are forced against the road or pavement, causing greater friction and wear. Truck tires are guaranteed for so many miles. The tire manufacturers base their guaranteed mileage on the fixed weight a certain size tire is built to carry. Thus a tire that is carrying an overload cannot possess the mileage of the tire which is carrying the rated load.

"Overloading the truck is equivalent to overloading the motor, because the motor is designed to produce power equivalent to the performance of the truck with a normal load. This shows plainly that if the truck is overloaded, more gear shifting and slower speed, as well as higher gasoline consumption must be expected. For example, the truck with a rated capacity of 5 tons has, we will say, a motor of a size necessary to take this truck with a 5-ton load up a 6 per cent grade without shifting gears. If 2,000 additional pounds were added, shifting gears would be necessary to make the same grade, or it might only make a 4½ per cent grade without shifting gears. And it is the same way on the level road. A truck that is built to carry a rated load at say 15 miles an hour would be able to move an overload at probably no greater speed than 10 to 12 miles an hour.

"With the axles—wear and greater resistance, caused by excess weight, forces the wheels into the ground. When the power is turned on, the differential gears are subjected to greater stress to move the excess weight. Thus we can see that when the load is too far in excess, the driving effort on the axles will also be excessive.

"With the frame built to hold a certain tonnage, an overload is bound to cause a deflection each time it is so overloaded. If the elastic limit is overstepped continually, the frame will eventually break.

"Truck over-speeding is another habit easy to acquire which results in excessive strains and a greatly accelerated rate of depreciation. The advantages of motor truck haulage over horses are not only a matter of speed, but rather the gain accruing from constant operation in all sorts of weather at any time of the day or night.

"Upkeep and depreciation are serious items to the truck owner and the relation between efficiency and speed is of equally vital importance. That's why the overspeeding of heavily loaded trucks in rough and tumble fashion is every bit as dangerous as truck overloading."

We have nearly two million men in France. Every subscriber to the Liberty Loan helped send them there.

The Rock Products Market

Agricultural Limestone Wholesale at Plant, per Ton

EASTERN

Cambria, N. Y.—Analysis, $CaCO_3$, 94%; $MgCO_3$, 4%	2.40
Coldwater, near Rochester, N. Y.—(80% thru 100 mesh; 100% thru 12 mesh) Analysis, $CaCO_3$, 56.77%; $MgCO_3$, 41.74%	2.00@2.65
Danbury, Conn.—(50% thru 100) Analysis, $CaCO_3$, 96%; $MgCO_3$, 2%; ppr., $4.00; bulk	2.75
Hillsville, Pa.—(90% thru 100 mesh) in 80 lb. ppr. bags, $4.50; bulk	3.00
Jamestown, N. Y.—(90% thru 100 mesh)—Bags	2.50
Pownal, Vt. (50% thru 100) Analysis, $CaCO_3$, 96%; $MgCO_3$, 2%; ppr., $4.00; bulk	2.75
Walford, Pa.—(70% thru 100; 50% thru 50; 100% thru 10; 50% thru 4) Paper, $4.50; bulk	3.00
West Stockbridge, Mass. — (50% thru 100) Analysis, $CaCO_3$, 96%; $MgCO_3$, 2%; ppr., $4.00; bulk	2.75

CENTRAL:

Alton, Ill.—(Pulv. and 90% thru 50 mesh) Analysis, $CaCO_3$, 95%; $MgCO_3$, 3%	2.00
Bedford, Ind.—(90% thru 10 mesh) Analysis, $CaCO_3$, 98.5%; $MgCO_3$, 0.5%	1.75
Columbia, Ill., near East St. Louis —(⅛" down)	1.25@1.80
Elmhurst, Ill. — Analysis, $CaCO_3$, 29.43%; $MgCO_3$, 20.69%	1.00
Greencastle, Ind. — (50% thru 50 mesh) Analysis $CaCO_3$, 98%	1.75
Irvington, Ky.—(90% thru 4 mesh)	1.90
Lannon, Wis.—(50% thru 50 mesh) Analysis, 53.35%, $CaCO_3$; 43.27% $MgCO_3$	2.00
Marblehead, O.—(50% thru 100 mesh; pulverized limestone) 80 lb., ppr., $4.50; bulk	3.00
McCook, Ill.—(90% thru 4 mesh)	.75@1.00
McCook, Ill.—(100% thru ¼" sieve; 78:12% thru No. 10; 53:29% thru No. 20; 38:14% thru No. 30; 26:04% thru No. 50; 16:27% thru No. 100) Analysis, $CaCO_3$, 54.10%; $MgCO_3$, 45.04%	1.00@1.25
Montrose, Ia.—(90% thru 100 mesh)	1.25@1.50
Muskegon, Mich.—(50% thru 50 mesh) Analysis, $CaCO_3$, 53.35%; $MgCO_3$, 43.27%	1.50@2.00
North Industry, O.—(50% thru 100 mesh; and pulverized limestone) Analysis, $CaCO_3$, 91%; $MgCO_3$, 1.63%	3.00
Piqua, O.—(50% thru 100 mesh)	2.50@4.00
Rockford, Ill.—Analysis, $CaCO_3$, 53.75%; $MgCO_3$, 44.35%	1.25
Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ⅛" mesh) Analysis, $CaCO_3$, 89.61 to 89.91%; $MgCO_3$, 3.82%	1.50
Stone City, Ia.—(50% thru 50 mesh)	.50

SOUTHERN:

Atlanta, Ga.—(100% thru 10 mesh—all dust contained) combined carbonates, 98%	3.00
Brooksville, Fla.—Pulverized limestone	1.80
Keystone, Ala.—(90% thru 50 mesh) Analysis, $CaCO_3$, 99.50%; $MgCO_3$, none	1.25
Knoxville, Tenn.—Analysis: $CaCO_3$, 52%; $MgCO_3$, 38%—	
90% thru 100 mesh	3.50
50% thru 50 mesh	2.00
Stephensburg, Ky.—Analysis, $CaCO_3$, 98%	1.20
Winnfield, La.—(50% thru 50 mesh)	3.00

WESTERN

Cement, Cal.—(50% thru 100 mesh)	4.00
Elsberry, Mo.—(Pulverized) Analysis,, $CaCO_3$, 99.29%	1.85@1.95
Fresno, Cal.—(All thru 40 mesh) Analysis, $CaCO_3$, 98%; $MgCO_3$, 1%. (50% and 40% thru 200 mesh) sacked, $5.50; bulk, $5.00. (100% thru 40 mesh) sacked, $5.25; bulk	4.75
Bulk	1.50
Kansas City, Mo.—(50% thru 100 mesh)	1.10

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo	One dollar per net ton, all sizes					
Burlington, Vt.	.....	.....	2.50	1.75	1.75	.....
Coldwater, N. Y.	1.50	.....	1.50	1.50	1.50	1.50
Frederick, Md.	1.50	.....	2.10	1.90	1.65	1.40
Grove, Md.	1.50	2.10	2.00	1.95	1.75	1.40
Hagerstown, Md.	$2.00 for all sizes					
Hillsville, Pa.	.90 for all sizes					
North Leroy and Akron, N. Y.	$1.00 for all sizes, including R. R. ballast					
Rock Cut, N. Y.	.80	1.20	1.20	1.20	1.20	1.20
Walford, Pa.	All sizes 1.35					
CENTRAL:						
Alton, Ill.	1.85	1.75	1.65	1.45	.....	.....
Cincinnati, Ohio	Various sizes $1.75 per net ton					
Cleveland, Ohio	Various sizes $1.90 per net ton					
Columbia, Ill. (near E. St. L.)	1.25@1.80	.85@1.20	.95@1.30	.95@1.30	.80@1.20	.....
Detroit, Mich.	Various sizes $1.50 per net ton					
Dundas, Ont.	.65	1.10	1.10	1.10	.90	.90
Eden and Knowles, Wis.	.80	.80	1.00	1.00	1.00	1.00
Elmhurst, Ill.	1.00	1.00	1.00	1.00	1.00	.90@1.00
Ft. Wayne, Ind.	Various sizes $1.60 per net ton					
Gary, Ill.	1.05	1.05	1.05	1.05	.80‖	.80‖
Greencastle, Ind.	1.00@1.25	1.10	1.00	.90@ .95	.90	.90
Illinois, Southern	1.[illegible]	1.25	1.25	1.25	1.25	.....
Lannon, Wis.	1.00 all sizes					
Lima, Ohio	1.10 for all sizes					
Linwood, Scott Co., Ia.	[illegible]	.....	1.13	1.05	1.13	.....
Maysville, Wis.	.70	.70	1.10	1.10	1.10	1.10
McCook, Ill.	.75@1.25	1.00@1.75	.70@1.15	.70@1.00	.70@1.10	.70@ .90
Oshkosh, Wis.	1.00 in all sizes, Blue Limestone					
Ottawa, Can.	1.90	2.00	2.00	1.75	1.50	.....
River Rouge, Mich.	.60@1.00	.95@1.00	.95@1.00	.95@1.00	.95@1.00	.95@1.00
Rockford, Ill.	1.25	.....	.....	1.25	1.25	1.25
Saginaw, Mich.	.95	.95	.95	1.05	.95	.95
Sheboygan, Wis.	.80@1.00 for all sizes					
Stone City, Ia.	.....	.....	1.20	1.10	1.00	.....
SOUTHERN:						
Atlanta, Ga.—Dolomite	.....	2.40	2.30	2.20	2.10	.....
Brookville, Fla.	.....	.....	.....	2.50	.....	.....
Fort Springs, W. Va.	.50	1.20	1.20	1.35	1.10	1.10*‖
Irvington, Ky.	.75	.....	.....	.75	.75	.....
Stephensburg, Ky.	[illegible] any size					
Winnfield, La.	1.20	1.80	1.80	1.80	1.80	1.80
WESTERN:						
Atchison, Kans.	.25	1.30	1.30	1.30	1.20	1.20
Blue Sprgs. & Wymore, Neb.	(Florence flint imbedded in limestone)					
	.15	1.35	1.35	1.25	1.15	1.10
Carthage, Mo.	1.50	1.50	1.25	1.25	1.25	1.25
El Paso, Tex.	.90 for all sizes					
Kansas City, Mo.	.50	1.25	1.25	1.25	1.25	1.25

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Baltimore, Md. (vicinity)—Trap	1.50	3.25	2.85	2.75	2.25	.....
Birdsboro, Pa.	1.25	1.75	1.50	1 25	1.25	1.25
Duluth, Minn.—Trap	.65@ .75	1.35@1.50	1.25@1.35	1.15@1.25	1.15@1.25	.....
Farmington, Conn.	.70	.85	.85	.80	.....	.....
Glen Mills and Rock Hill, Pa. —Trap	1.10	1.40 R. R. ballast	1.60	1.60	1.60	1.40
Little Rock, Ark.—Trap	.....	1.75	.....	1.75	1.50	1.35
Millington, N. J.	1.75	1.85	1.75	1.60	.....	1.20‖
Montrose, Ia.—Trap	.....	1.10@1.20	1.10@1.25	1.05@1.10	1.00@1.10	.....
Morristown, N. J.—Trap	1.85	1.75	1.75	1.60	1.40	1.40
North Branford, Conn.—Trap.	.80	1.30	1.25	1.20	1.10	.....
Oakland, Cal.	1.90	1.90	1.75	1.75	1.75	.....
Stephensburg, Ky.	1.26 per cu. yd. for any size produced					
Westfield, Mass.—Trap	.60	1.00	1.10	1.00	.90	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Boulder, Colo.—Sandstone	2.00 per yd. for any size made					
Brooksville, Fla.—Flint	1.00	.....	.....	2.25	.....	.....
Fair Oaks, Calif.—Crushed Bldrs.	.85	1.05	.95	.85	.85	.....
Hendlers, Pa.—Quartzite	.75	1.00	1.35	1.25	1.00	1.00‖
Little Falls, N. Y.—Syenite	.60	Other sizes 1.00, including R. R. ballast				
Richmond, Va.—Granite	1.25	1.50	1.50	1.50	1.50	1.50
Stephensburg, Ky.	1.26 per cu. yd. any size Basalt and other kinds					
Stockbridge, Ga.—Granite	.50	2.10	2.10	2.00	2.00	1.95
Webb City, Mo.—Flint	.60	.35	1.25	1.25	1.25	1.25

*Cubic yard. †Agri. lime. ‖R. R. ballast. §Flux. ‡Rip-rap.

Current Wholesale Prices in New York

CURRENT wholesale prices, prevailing on the Building Material Exchange and elsewhere in the Metropolitan district in New York, are given as below in the Record and Guide. Allowances must be made for yard and store prices:

Cement (wholesale, 1,000 bbls. lots and over, alongside dock, N. Y.):
Domestic Portland, Spot.....3.20@——
Rebate on bags, returned, 25c bag.
Rosendale Natural to dealers, wood or duck bags.....——@——
Rebate on bags, returned, 10c bag.

Gravel (500 cu. yd. lots f. o. b. alongside dock N. Y., wholesale):
1½ in. (nominal).....$2.00@——
Other sizes, no quotations.

Sand—
Screened and washed Cow Bay. 500 cu. yds. lots, wholesale..$1.25@——

Lime (standard 300-lb. bbls.):
Eastern common, wholesale price .....$2.50@——
Eastern finishing, wholesale price .....$2.70@——
Hydrated common (per ton)..15.20@——
Hydrated finishing (per ton)..17.20@——

Window Glass. Official discounts from manufacturers' lists:
Single strength, A quality, first three brackets 77%
B grade, single strength, first three brackets 77%
Grades A and B, larger than the first three brackets, single thick.....77%
Double strength, A quality.....79%
Double strength, B quality.....81%

Plaster—(Basic prices to dealers at yard, Manhattan):
Mason's finishing in 100 lbs. bags, per ton.....$23.00@——
Dry Mortar, in bags, returnable at 30c each per ton.... 14.05@——
Block, 2 in. (solid), per sq. ft.....$0.11
Block, 3 in. (hollow), per sq. ft.... 0.11

Crushed Stone (500 cu. yd. lots, f. o. b. alongside dock N. Y., wholesale):
Trap rock, 1½ in. (nominal)...$2.00@——
Trap rock, ¾ in. (nominal)... 1.95@——
Crushed limestone, 1½ in..... 1.80@ 1.85
Crushed limestone, ¾ in..... 1.90@ 2.00

Building Stone—
Indiana limestone, per cu. ft.....$1.28
Kentucky limestone, per cu. ft..... 1.50
Brier Hill sandstone, per cu. ft..... 1.50
Gray Canyon sandstone, per cu. ft.... .95
Buff Wakeman, per cu. ft..... 1.50
Buff Mountain, per cu. ft..... 1.50
North River bluestone, per cu. ft..... 1.05
Seam face granite, per sq. ft..... 1.00

(Continued on page 43)

Miscellaneous Sands per Ton at Plant

Albany, N. Y.—Molding	1.75@2.00
Allentown, Pa.—Moulding	1.25
Bowmanstown, Pa.—Moulding	1.50
Bowmanstown, Pa.—Glass sand	2.00@2.50
Cedarville, N. J.—Glass	1.50@4.00
Hellam, Pa.—Glass	2.00
Dundee, Ohio—Glass	2.00@2.50
Mapleton, Pa.—Railroad, molding and glass sand, damp, $3.00; dry	3.50
Massillon, Ohio—Glass	2.00
Michigan City, Ind.—Core	.40
Michigan City, Ind.—Bottle, Jar and Grinding Glass sand	.30
Mineral Ridge, O.—Glass	1.75@2.75
New Lexington, Stamden and Killbuck, Ohio—Moulding	1.25
Ottawa, Ill.—Crystal Silica	2.00@2.50
St. Mary's, Pa.—Glass sand—Green, $2.50; washed	3.00
Sands, Elk Co., Pa.—Glass sand, $2.50; selected glass sand	3.00
Sugar Grove, Ohio—Glass	2.25@2.50
West Albany, N. Y.—Moulding	2.00@5.00
Zanesville, O.—Molding, fine	1.75
Nos. 2 and 3 medium, No. 4 coarse	1.50

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Bowmanstown, Pa.	.....	1.20	1.10	.....	.....	.....
Buffalo, N. Y.	1.00 cu. yd., all sizes					
Buffalo, N. Y. (Niagara River)	.80	.75	.70	.70	.70	.70
Cochranton, Pa.	.....	1.00	1.00	.....	.....	1.00
Libby's Pit, Leeds Junct, Me.	1.00	.50@ .60	1.50	.....	1.35	1.25
Morristown, N. J.	.....	.50	1.00	1.00	1.00	.90
No. Wilbraham, Mass.	.....	.50*	1.75*	.....	1.20*	1.05*
Washington, D. C.	.....	.75	.....	.....	.....	1.20
CENTRAL:						
Algonquin, Ill.	All grades .50 per cu. yd. (3,000 lbs.)					
Barton, Wis.	.75	.70	1.00	.70	.70	.70
Bay City, Mich. (on cars)	.78	.78	1.68	1.43	1.43	1.33
Cherokee, Ia.	.40@ .60	.40@ .60	.....	.95@1.25	.....	.85@1.00
Chicago, Ill.	.....	1.00	1.00	1.00	1.00	.....
Cincinnati, Ohio	.40@ .50	.40@ .50	.40@ .50	.50@ .60	.50@ .60	.50@ .60
Clinton, Ind.	.....	.75	.85	.75	.75	.....
Columbus, O.	.....	.60	.50	.60	.60	.60
Des Moines, Ia.	40@ .75	.50	1.25@1.50	1.25@1.50	1.00@1.25	1.00@1.25
Elgin, Ill.	.....	.50	.50	.50	50	.50
Escanaba, Mich.	.....	1.15*	1.20	1.20	.85	.85
Fort Dodge, Ia.	1.00	.90	1.50	.....	1.50	1.50
Hawarden, Ia.	.40@ .60	.40@ .60	.....	.95@1.25	.....	.85@1.00
Greenville and Mechanicsburg, O.	.50	.50	.50	.60	.60	.60
Illinois, Northern	.60@ .70	.70	.70@ .80	.70@ .80	.60@ .70	.50@ .60
Indianapolis, Ind.	.....	.50	.65	.65	.65	.65
Janesville, Wis.	.....	.28@ .55	.....	.....	.28@ .55	.....
Keithsburg, Ill.	.....	.60@ .70	.....	.65@ .80	.....	.....
Jackson, Mich.	.40@ .50	.40@ .50	.40@ .50	.50@ .60	.50@ .60	.50@ .60
Mason City, Ia.	.60	.50	1.10@1.20	1.20	1.00@1.20	1.00@1.20
		Railway ballast and road work, .40				
Milwaukee, Wis.	1.06 for all sizes					
Minneapolis, Minn.	.50* 2800 lbs.	.50* 2800 lbs.	1.25* 2660 lbs.	1.20* 2600 lbs.	1.15* 2600 lbs.	1.10* 2600 lbs.
Moline, Ill.	.50@ .60	.50@ .60	1.20	1.00	.90	.90
Montezuma, Covington, Ind.	.75	.75	.85	.75	.75	.75
Niles, Mich.	.....	.50@ .80	.60@ .85	.50@ .80	.50@ .80	.50@ .80
Sabula, Ia.	.60	.60	1.00	1.00	.90	.90
Saginaw, Mich. (on cars)	.94	.94	1.90	1.65	1.60	1.60
St. Paul, Minn.	.65*	.65*	1.75*	1.25	1.15*	1.15*
Terre Haute, Ind.	.75	.75	.75@ .85	.75	.75	.75
Toledo, Ohio	.55	.55	.....	.....	.....	.....
Wabash Valley District, Ind.	All sizes, .75.					
Wolcotville, Ind.	.35	.35	1.10	.50@ .60	.50@ .60	.50@ .60
Winona, Minn.	.60@ .90	.60@ .90	1.00@1.40	1.00@1.40	.95@1.25	.95@1.25
Winona Lake, Ind.	.....	.85	.....	.....	.....	.....
SOUTHERN:						
Charleston, W. Va. (River)	1.20	1.20	1.30	1.30	1.30	1.30
Lake Weir, Fla.	.....	.50	.....	.....	.....	.....
Knoxville, Tenn.	.85@ .90	.85@ .90	1.00@1.50	1.00@1.50	.95@1.40	.95@1.40
New Orleans, La.	1.70*	(2500 lbs.)	2.50*	(2700 lbs.)	.....	.....
Pelzer, S. C.	All sizes, .55 per net ton					
Valde Rouge, La.	.....	.75*@1.00*	2.10*	2.00*	1.50*	1.25*
Waco, Tex.	.75	.75	1.20	1.20	1.00	1.00
WESTERN:						
Denver, Col.	.....	.50* (2,700 lbs.)	.....	.....	.....	.....
Joplin, Mo.	.60	.60	.40	.....	.....	.....
Kansas City, Mo.	Car lots, building sand, @ .50; retail truck 1.50*					
Lincoln, Neb. (Pit)	.75	.75	1.80	1.80	1.80	1.60
Pueblo, Colo.	.80	.60	1.50	1.50	1.50	.....
Roche Spur, Tulare Co., Cal.	.30@.35 River sand ¼ inch					
Seattle, Wash.	.....	1.00*	1.75*	1.00*	1.00*	1.00*
Vancouver, B. C. (Scows)	.....	1.45*	1.70*	1.65*	1.65*	1.45*

Bank Run Sand and Gravel

City or shipping point	Fine sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	.45	.45	.....	.60	.60	.60
Burnside, Sand Pit, Conn.		All sand, .85 cu. yd.				
Bushnell's Basin, N. Y. (near Rochester)		All sizes, .40@ .50				
Forestport, N. Y.	1.00	1.00	.....	.....	.....	.....
Lowell Junction, Mass.	.....	.50*@ .75*	.....	.....	.....	1.25*
Yardville, N. J.	.....	.50 @ .75	.....	.....	.....	.....
York, Pa.	.....	1.00@1.10	.....	.....	.....	.....
CENTRAL:						
Attica, Ind.	.75					
Bay City, Mich. (on dock)	.....	.55	.....	.....	.....	1.00
Clinton, Ind.	.50	.....	.....	.....	.....	.....
Des Moines, Ia.		Concrete mix washed at .60 per ton				
Escanaba, Mich.	.....	.50*	.....	.....	.....	.....
Janesville, Wis.	.....	.....	.....	.....	.28@ .55	.....
Keithsburg, Ill.	.....	.40@ .60	.....	.....	.....	.....
Moline, Ill.	.....	.....	.70@ .80 unscreened			
Montezuma, Ind.	.....	.....	.....	.....	.60	.60
Palestine, Ind.	.75					
Portsmouth, Ohio	.....	.65	.....	.85	.....	.....
Saginaw, Mich. (on cars)	1.20	1.20	1.80	1.80	1.80	1.80
Terre Haute, Montezuma, Ind.		.60 unscreened				
Toledo, O.	.....	.....	.....	.....	.....	.55@1.00
Winona, Minn.		Pit run gravel under 2-in., .60@.90				
SOUTHERN:						
Howcott, La.	50% and up sand-clay road gravel, .65					
Joplin, Mo.	.75	.60	.40	.....	.....	.....
Knoxville, Tenn.	.85@ .90	.....	.....	.....	.....	.....
Lindsay, Tex.	.....	.....	.....	.....	.40‖	.45‖
Valde Rouge, La.	Gravel 60% metal on ⅛" screen, .60 per ton					
WESTERN:						
Denver, Colo.	.....	.....	.30*	.....	.....	.....
Pueblo, Colo.		River Run .60 unscreened				
Vancouver, B. C.	.....	.85@1.10	.....	1.00@1.25	.....	.85@1.00

* Cubic yard. ¶ .25 millrun; screened .50. B Bank. L Lake. ‖ Ballast.

Current Wholesale Prices in New York

(Continued from page 42)

S. Dover marble (promiscuous mill blocks, per cu. ft.....$2.25
White Vermont marble (sawed), New York, per cu. ft..... 3.00

Architects, contractors, material dealers and prospective builders are gradually becoming familiar with the new requirements of the War Industries Board in regard to non-war construction.

The markets for building materials and supplies are extremely quiet. Aside from the orders from Government sources and the contractors who have structures well advanced, there is little buying activity prevalent. According to the present outlook there will be no resumption of structural activity on a large scale until the war is over and the economic situation of the United States returns to a more normal basis. Prices in all lines are steady with a continued tendency toward further advances.

Portland Cement—But little variation in the Portland cement situation is to be noted from week to week. Producers are operating to the limit permitted by the fuel restrictions, and the fact that a place was not given to this material on the priorities list as it now stands would seem to indicate that the output may eventually be somewhat reduced beyond the restrictions now in force. New developments in the cement situation are constantly manifesting themselves, and it is difficult to anticipate what conditions are likely to appear in the near future. Portland cement prices are firm and unchanged.

Window Glass—Conditions in the local window glass situation continue to be unsatisfactory and as yet it is doubtful whether any new glass will be manufactured before the commencement of the new year. At the present time there is no prospect of improved conditions in the trade, as the producing end of the industry does not know exactly how it stands regarding fuel and raw materials. Manufacturers' discounts remain unchanged.

BUY LIBERTY BONDS

War Industries Board Will Develop Domestic Potash

PLANS for developing the domestic potash industry are being considered by the War Industries Board, it became known today, and some announcement is expected shortly.

Whether development shall be through a leasing system or directly under government control is the principal question under discussion.

BUY LIBERTY BONDS

Bonds Build Airplanes. Buy Liberty Bonds.

Baruch Gives Four Reasons for Curtailing Building

CHAIRMAN Bernard M. Baruch of the War Industries Board has replied to Senator Calder's criticism of the board's action in curtailing building construction as follows:

"In carrying out the duties with which we were thus charged by the President, the War Industries Board and its chairman found the following situation to exist with respect to building and construction facilities and supplies:

"a. Iron and steel are a necessary part of every completed building. They are necessary for plumbing, heating, ventilating, piping, hardware, and mechanical equipment. The direct and indirect war needs of this country and of our allies for the last six months of the current year already exceed 21,000,000 tons and the country's total output for the first six months was less than 17,000,000 tons. The unavoidable result is that iron and steel can not be used for nonwar or less essential purposes.

"b. The United States Fuel Administration, finding that the production of building materials consumed upwards of 30,000,000 tons of fuel per annum, and that there was a shortage in the fuel necessary for our war program, curtailed very materially the fuel allowed for building materials. The continued production of building materials for non-war and less-essential projects would now necessarily be at the expense of productions which our war program requires.

"c. The Railroad Administration finds that 25 per cent of the total tonnage moved by the railroads is building material. It is absolutely essential that the portion of this tonnage which represents materials not needed for war or essential purposes should be displaced by tonnage which is.

"d. The United States Employment Service finds that there is an acute shortage in the labor needed for the war program. It is absolutely essential that labor which may now be idle, or which may be engaged on nonwar or less-essential work, should be employed upon work which will contribute toward winning the war."

BUY LIBERTY BONDS

Olsen Now Secretary of Wisconsin Association

GEORGE A. OLSEN, executive secretary of the Chicago Building Material Exchange, has resigned that position and accepted the secretaryship of the Wisconsin Building Material and Fuel Merchants' Association.

For the past eighteen months, Mr. Olsen has been in charge of the affairs of the Chicago Exchange, previous to which he was affiliated with ROCK PRODUCTS as one of its editors. During the past six years he has had extensive experience in organization work.

The Wisconsin Association, which was recently organized, operates in the eleven northeast counties of Wisconsin and includes in its membership retail merchants of building material and fuel. Its start has been so successful that neighboring counties are clamoring for admission to its ranks. The members will either grant admission or aid in forming another association.

With Mr. Olsen, the Wisconsin Building Material and Fuel Merchants' Association is destined to become one of the most aggressive associations of the country. The successful history of their former organization—the Fox River Valley Building Material Dealers' Association—is well known in association circles and forms a foundation for the new venture.

BUY LIBERTY BONDS

Where the Money Goes in the War for Liberty

SINCE the beginning of the war, we have spent for Army use $37,000,000 for flour; $14,000,000 for sugar; $43,000,000 for bacon; $12,000,000 for beans; $9,000,000 for canned tomatoes, and $3,000,000 for rice. These are only some of the large items in our Army's bill of fare. We have spent $126,000,000 for shoes; over $500,000,000 for clothing, winter and summer; nearly $150,000,000 for blankets.

Our axes for the Army have cost over $6,000,000; our rolling kitchens $47,000,000 and field ranges $1,500,000. The Army is using 2,500,000 shovels costing $1 apiece. Our motor trucks to carry supplies and ammunition cost $240,000,000, and for horse-drawn wagons and carts we have spent $37,000,000. Our 279,000 horses and 132,000 mules have cost us nearly $100,000,000; to feed them has cost over $60,000,000 and the harness for them nearly $30,000,000.

These figures are large, but we have nearly 2,000,000 men in France and nearly as many in cantonments here, and the United States and the people of the United States, through the Liberty Loan are making these soldiers as safe and as comfortable, as powerful and effective as possible.

Every subscriber to the Liberty Loan has helped, and every subscriber to the Fourth Liberty Loan will help to win the war.

Freight Increase on Cement Granted in East

THE Interstate Commerce Commission, Washington, D. C., has granted permission to various railroad companies to increase the railroad freight rates on cement from the Lehigh and Hudson districts to points in New England from $2.20 to $3.

Incorporations

A-1 Sand & Gravel Co., Cleveland, O., $10,000. Charles E. Phipps.

The Silica Canadian, Toronto, has been registered.

Georgia Potash & Chemical Corporation, Wilmington, Del. To extract by chemical and other processes potash from shale. Capital, $100,000.

The Sunset Potash Co. has been incorporated in Oakland, Cal. Capital, $50,000. Incorporators are: M. M. Harris, Joe Enzensperger and J. W. Welch.

Concrete Ship Corporation, N. Y.; capital, $2,000,000. To build ships of concrete, steel, wood or other materials. Daniel J. Boylan, Frank H. Prindle, New York; G. F. Newton, Brooklyn, N. Y.

Incorporated in Minnesota, the Duluth Cut Stone Co. The incorporators are William Penn, of Minneapolis; John A. Smith, of Minneapolis, and John Horman, of Duluth. The capitalization is $50,000.

The Associated Potash Plants of Alliance, Neb., has been organized by Lloyd Thomas, state representative and editor of the Alliance Herald. Capital, $500.000. Lloyd C. Thomas, B. M. Thomas, F. A. Bald and E. K. Bald are the incorporators.

Cockley Oil Co. $100.000. Williamson, Burleigh & McLean, Augusta, Me. Explore and develop mines, minerals and ores of all kinds. Clerk, Ernest L. McLean; president and treasurer, E. M. Leavitt; directors, Ernest L. McLean and E. M. Leavitt, Augusta, Me.

Kingwood Oil Co., Portland, Me. $5,000.000. (Verrill Hale Booth & Ives.) Mining all kinds of minerals. Clerk, John F. Dana; president, E. V. Mann; treasurer, E H. Irwin; directors, E. V. Mann, E. H. Irwin. M. D. Mills, F. B. Rowe, M. D. Griffin, all of Portland, Me.

Wyoming Fuel Oil Co. $1.500.000. The Corporation Trust Co., Portland, Me. Developing mineral and oil lands. Clerk, A. B. Farnham; president, Clarence G. Trott; treasurer, R. L. Johnson; directors, Clarence G. Trott, R. L. Johnson, David F. Drew, all of Portland.

Montana Mines, Kittery, Me. General mining and quarrying business. Aaron B. Cole, Clerk, Kittery, Me.; Pres., Aaron B. Cole; Treas., M. E. Anderson; Directors, Aaron B. Cole, M. E. Anderson, R. E. Clark, L. B. Cole, Kittery, Me. Capital, $50,000.

Texcalokan Oil & Gas Co. Horace Mitchell, Kittery, Me. Operate and develop oil, gas and mineral lands. Clerk, Horace Mitchell; president, Horace Mitchell; treasurer, M. G. Mitchell, Kittery, Me.; directors, Horace Mitchell, M. G. Mitchell and P. L. Winn, Portsmouth, N. H.

Interior Petroleum Co. $300.000. Williamson, Burleigh & McLean, Augusta, Me. Dealing in mineral substances of all kinds. Clerk, Ernest L. McLean; president and treasurer, E. M. Leavitt; directors. Ernest L. McLean, E. M. Leavitt, Clyde R. Chapman, M. F. Hearin, all of Augusta, Me.

Hill Petroleum Corporation. $1,000.000. 85 Exchange street, Portland, Me. Operating coal and mineral lands of all kinds Clerk, H. P. Sweetser; president, E. P. Thompson; treasurer, H. P. Sweetser; directors. E. P. Thompson. H. P. Sweetser, Gerry L. Brooks, A. P. Brewer, all of Portland, Me.

Johnson & King Coal Co. $500,000. The Corporation Trust Co., Portland, Me. Develop and operate coal and mineral lands of all kinds. Clerk, A. B. Farnham; president, R. L. Johnson; treasurer, E. Connor; directors. R. L. Johnson, E. Connor and A. B. Farnham, all of Portland, Me.

Bradley Lumber & Manufacturing Co., 98 Exchange St., Portland, Maine. Deal in and explore for phosphate rock and all other minerals. Clerk, Thomas L. Talbot; Pres., Virgil C. Wilson; Treas., Thomas L. Talbot; Directors, Virgil C Wilson, Dorothy E. Rundlett, Thomas L. Talbot, Portland, Maine. Capital, $1,500 000.

Chipley Oil Co., Skowhegan, Me. Drill and operate for oil, minerals and mineral substances. Clerk, Amos K. Butler; Pres., Willard H. Cummings; Treas., Francis W. Briggs; Directors, Francis W. Briggs, Herbert L. Swett, Willard H. Cummings, Marie G. Fletcher and Amos K. Butler, Skowhegan, Maine. Capital, $150,000.

The Claremont Marl Products Co., recently incorporated at Claremont, Va., with $250,000 capital stock, has been organized by the election of the following officers: H. J. Harrington, of Claremont, president; James V. Trehy, of Norfolk, vice-president; G. P. Reed, of Norfolk, secretary. The company has acquired marl lands near Claremont and will erect a plant and equip it with electric generators, pumps, engines, etc., for the development of the marl beds on some 400 or 500 acres of land.

New Construction

The Carbon Limestone Co., Hillsville, Pa., will build an addition to its plant.

The Davison Sand & Gravel Co., Pittsburgh, Pa., is making rapid progress in the construction of a new two-story addition to its plant, about 40x105 feet, to cost $12,000.

The Bridgeport Cement & Stone Co., of Bridgeport, Tex., has acquired a stone-crushing plant at Chico, Tex., and is said to be planning new additions and general improvements.

The Merle Manufacturing Co., of San Francisco, has acquired a factory site at Redwood City, Cal., and it is announced that a plant will shortly be erected for manufacturing potash and magnesia. At the outset the concern will cater to the powder trade.

Chips and waste stone from the Bedford Stone Co.'s plant at Bloomington, Ind., will be utilized in the manufacture of cemite and a fertilizer byproduct by the American Cemite Co., recently organized with a capital of $250,000. The latter company will build soon close to the Bedford quarry.

Lime

To its already extensive quarry and crusher plant at Millville, Pa., the Standard Lime & Stone Co. will add a lime roasting equipment. L. H. Eberhart is in charge of the work.

The Eichel lime plant at Milltown, Ind., which was owned by J. B. Speed & Co., of Louisville, Ky., was destroyed by fire two weeks ago. The loss is estimated at $25,000.

One of the best deposits of limestone which has been tested in Bradford County, Pennsylvania, is that on the farm owned by Eugene Stone at Camptown. A recent sample taken shows that the rock as pulverized contained 87 per cent of carbonate of lime or calcium carbonate CaCo3.

Manufacturers

The Fairbanks Co. has removed its Chicago office from No 188 North Market St. to No. 64 East Lake St., Chicago. The new store is a five-floor and basement building and will be arranged for carrying a complete line of valves, trucks and barrows, gas engines and equipments, transmissions and all appurtenances, steam goods and a complete list of machinery.

Phosphate

The Seminole Phosphate Co., Croon, Fla., has recently completed a plant at Croon for purverizing soft phosphate. The plant has four Bradley pulverizers and three Sprout-Waldron pulverizers. It is turning out 250 tons daily. W. F. Walker is president and E. N. Morrow is secretary.

Gypsum Products

The Hillsboro Quarries, New Brunswick, produced upwards of 33,000 tons of gypsum last year. About 5,000 tons of this went to the United States.

Personals

W. J. Armstrong, manager of the crushing and pulverizing sales department of the Jeffrey Manufacturing Co., Columbus, Ohio, has recently received an appointment as captain in the U. S. Army and assigned to the Ordnance Department in Washington, D. C.

Christian B. Zabriskie, of New York, vice-president and general manager of the Pacific Coast Borax Co., who has been visiting the company's properties at Searles Lake, Cal., states that the plant is being enlarged and that the government is leasing surrounding land to persons who will work their land and produce potash.

Payne G. West has been appointed assistant manager of field sales for the Lakewood Engineering Co., Cleveland. Mr. West is a graduate of Carroll College, 1901. He later studied civil engineering for two years at the University of Wisconsin. In 1907 he became associated with the T. L. Smith Co., of Milwaukee. During 12 years with this firm—most of which he was assistant sales manager—Mr. West thoroughly familiarized himself with all branches of the machinery field as well as with factory production methods.

Frank P. Jones, general manager of the Canada Cement Co., has been appointed a director of the Canadian Northern Railway, which has just been taken over by the Canadian government. Mr Jones was born at Brockville in 1870, graduated from the Royal Military College and began business as fireman in the factory of the Jones Mfg. Co., Gananoque. From 1905 to 1909 he was first salesman for the Nova Scotia Steel & Coal Co. and afterward as sales agent of the Dominion Iron & Steel Co. In 1910 he became general manager of the Canada Cement Co. Upon the formation of the War Trade Board he was appointed its vice-chairman.

OBITUARY

W. H. Anderson, president of the Dominion Concrete Co., Ltd., Kemptville, is dead.

William H. Boggs, superintendent at the plant of the Paragon Plaster Co., of Syracuse, N. Y., died on September 22, at his home, 745 West Onondaga Street, following an illness of four months from chronic heart disease. Mr. Boggs, who was 52 years of age, has been identified with the affairs of the Paragon Plaster Co. for many years.

Potash

Change in name: Atlantic Potash Corporation, to Liberty Potash & Chemical Co., Dover, Del.

The Kimball Potash Co., Alliance, Neb., one of the smaller concerns in the field, has started the manufacture of the product at their new plant six miles south of Birdsell.

A London report said, "G. Mure Ritchie, presiding at Furness Abbey at the annual meeting of the Millom and Askam Hematite Iron Co., Ltd., announced that the company would shortly be producing potash. The Millom Company would be one of the largest producers.

It is possible that the state of Iowa may establish a refining potash plant at Goose lake in Greene county. Deposits found at the lake are now being analyzed. If it proves to be of good quality and is found in extensive quantities the state may go into the business of handling potash. There are 800 acres in Goose lake owned by the state.

Prof. McLaurin, of Saskatchewan University, has reported that the quality of the potash, sodium sulphate and epsom salts deposits at Maple Creek, Sask., is excellent. Twenty-five acres have been staked. It is said that the deposit is similar to that of Searles Lake, California. Following this discovery one is reported near Hardy, Sask., on the Canadian Northern Railway, south of Regina. It is the bed of an old lake and samples from the top substance show a percentage of potash and other Salts. Claims are being staked out and samples have been sent away to be analyzed.

Quarries

The assets of the Chateau Riches Quarry Co., Sault a la Puce, Que., are advertised for sale.

Mt. Pleasant, Ia., stone quarry, which has been in operation south of that city for a good many years, closed recently, probably for the duration of the war.

Machinery has been installed at the Gorsuch quarries at Peach Bottom, says the Philadelphia Record, whereby crushed slate will be obtained from the refuse as a filler for roofing.

The Bethlehem Mines Corporation has purchased from the A. K. Schoener heirs the 94-acre tract of limestone deposits east of Lebanon, Pa., for $25,000. The Bethlehem Steel Co. is in need of limestone for fluxing purposes at its various blast furnaces in that region.

Gates & Rogers, Marysville, Pa., contractors for the New Cumberland, Pa., Quartermaster's buildings, will obtain crushed stone from the Dyer stone quarry, near Marysville. Large quantities will be required for the construction of the new plant for the Army Department.

Damage estimated at $250,000 was caused when fire destroyed the mill of the Ingalls Stone Co. at Bedford, Ind. The night shift of workers was at work at the time the flames were discovered. C. C. Ingalls, president of the concern, said the origin was in doubt. The company has been at work on a stone contract for the government.

Cement

Hart & Page, Rockford, Ill., stone producers and contractors, are building a four-mile concrete road for the Rockford cantonment, Camp Grant. Gravel furnished by the Rockford Sand & Gravel Co., is used as the aggregate.

As a result of the prolonged drouth and water shortage many ranchmen and farmers of Western Texas are constructing concrete water storage tanks. Some are very large size capable of holding sufficient water to supply thousands of cattle. Underground concrete-lined silos are also being built.

The Alsen American Portland Cement Co.'s plant at Alsen, near Saugerties, N. Y., owned by German capital and which was taken over in spring by Alien Property Custodian A. Mitchell Palmer, is being appraised by R. M. Cleverdon, a government appraiser. The works is the largest of the three plants in the cement zone and up to early spring had been in operation for more than 15 years.

The plant of the Giant Portland Cement Co., Egypt, near Coplay, Pa., has been selected by the Army Department of the Government for the instruction of soldiers engaged in cement work. Early in September a contingent of about thirty soldiers arrived at the plant for a course of instruction in various features of cement manufacture. It is understood that the result of the study will be used in connection with army work in France.

In 1900 the late George Elliott launched the Ontario Portland Cement Co. of Brantford, Ont. Now the supply of marl at Blue Lake has become exhausted and the plant has ceased operations, going into voluntary liquidation. As a result the manufacturing plant, having a capacity of 400 bbls. per day, is now offered for sale. The lands at Blue Lake consisting of 64 acres and 170 acres near Beachville are for sale. The latter parcel of land contains a large supply of lime rock suitable for the manufacture of cement.

At a recent luncheon of the Rotary Club of Easton, Pa., G. S. Brown, of the Alpha Portland Cement Co., told the history of the company. He stated the Alpha was the first cement plant in that section, and one of the very first in the United States. It was built at Alpha in the early nineties. From an output of 1,000 barrels of cement a year, 20 years ago, has grown the big Alpha industry, which is today supplying 40 per cent of the cement requirements of the government.

Retail Dealers

The semi-annual list of members of the Pittsburg Builders' Exchange, in booklet form, as of July 1, is the largest yet issued by the exchange. It is in alphabetical and classified form and is intended as a guide to property owners, architects and builders in the selection of general contractors, sub-contractors and dealers in building materials.

Sand and Gravel

The Greenville Gravel Co., of Greenville, O., has increased its capital in Michigan from $108,000 to $200,000.

In order to get prompt delivery, many Des Moines, Ia., contractors are paying premiums over the regular prices for sand and gravel. This condition is brought about by the difficulty of making shipments, due to car shortage.

Thomas H. Bell has been appointed receiver of the Trenton Sand & Gravel Co., Trenton, O., following a suit of Harry Donnelly against the company for $1,000 on a promissory note. The company filed its answer, admitting the allegations of the petition and asking that a receiver be named. Bell has given $10,000 bond.

Inquiries have been made at Newark, N. J., by Peter Campbell, of the War Resources Committee, Region No. 3, with headquarters at the Board of Trade, Newark, for traveling or locomotive cranes, particularly of the type required in the excavation of sand or gravel. It is desired to purchase or rent for various federal departments any idle equipment of this nature.

Wyoming Sand & Stone Co., Wilkesbarre, Pa., have issued a sixteen page pamphlet giving information about sand and gravel and their various uses. The title is "Quality in Sand and Gravel." Illustrations of the plant and of the many ways in which sand and gravel is used abound in the pamphlet. Walls, slab work, railroad abutments, buildings, residences and factories, and bridges are shown. It makes a good advertisement for the material.

Even the sand in Lawrence county Pennsylvania, is doing a patriotic service and helping America to win the war. Sand is being removed from the valleys along the Neshannock Creek north of New Castle by the carload and a great proportion of it is being shipped for use in plants that are engaged in making machinery and war products for the United States Government. It is the finest kind of molding sand, Frank G. Hayden, who is in charge of the work, declares. Much of the sand is being used in molding Liberty motors, he reports.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

Of Rock Products published every two weeks at Chicago Illinois, for October 1, 1918.

State of Illinois, County of Cook.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared W. D. Callender, who, having been duly sworn according to law, deposes and says that he is the business manager of the Rock Products and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corporation. Editor, N. C. Rockwood. Managing editor, N. C. Rockwood. Business managers, Geo. P. Miller and W. D. Callender, all at 538 S. Clark street, Chicago.

2. That the owners are: (Give names and addresses of individual owners, or if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Tradepress Publishing Corporation, W. D. Callender, Geo. P. Miller, A. Perrin, T. J. Sullivan, Fred D. Porter, all at 538 S. Clark street, Chicago.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) There are none.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

(Signed) W. D. CALLENDER,
Business Manager.

Sworn to and subscribed before me this 30th day of September, 1918.

MICHAEL J. O'MALLEY, Notary Public.
(My commission expires March 8th, 1920.)

CLASSIFIED ADVERTISING

ADVERTISEMENTS in this department are for Positions Wanted, Positions Vacant, Business Opportunities, Plants for Sale, etc.

RATES: 25c per line, per insertion; minimum charge, 50c. With display of any sort, $2.50 per column inch, per insertion.

Plants for Sale

FOR SALE
ONE KILN LIME PLANT

Agricultural limestone pulverizing plant badly needed. Analysis of rock CaCo 96.89, MgCo 1.00. Owner wishes to sell on account of other business; will sell controlling interest or entire plant and quarry. Address:

T. E. HOPSON **Ft. Towson, Okla.**

FOR SALE—Limestone crushing plant with 5 lime kilns. Forty acres stone land. Eastern part of Indiana. Details furnished. Address Box 1264, care Rock Products.

FOR SALE

Five 10 ft. Morgan Gas Producers, complete with George Automatic Feeds. This is a complete Gas Plant with all flumes and necessary connections.

For particulars address
J. E. BAKER COMPANY
114 North George Street **York, Pa.**

FOR SALE OR LEASE: Crushed stone quarry situated near Wilkes-Barre, Pa. Very hard green sandstone, practically equal to trap rock for road material. Quarry equipped to produce five to six hundred tons per day—has frequently run eight hundred. Ample rail facilities and an extensive market. For detailed information communicate with Arthur L. Stull, 182 S. Franklin St., Wilkes-Barre, Pa.

Help Wanted

WANTED: Competent man to take charge of stone quarry producing crushed stone for railroad ballast, highway purposes and concrete work. State age and experience, also salary required, as well as where last employed. Address Box 1254, care Rock Products.

USED EQUIPMENT

ADVERTISEMENTS in this department are for the Sale and Want of Second-Hand Machinery and Equipment.

RATES: $2.50 per column inch per insertion.

FOR SALE

At Bargain Price

1 Little Giant Steam Shovel,

mounted on traction wheels, equipped with 54"x8' 6" upright Boiler, 7"x11" main engine, 5x6 boom and swing engine, one yard rock dipper. Crane has 12 ft. lift. Machine runs on street or road.

Flat Wheels: 12½" face. Gauge of wheels. 9' 2½"; inside to inside of wheels 8' 2½".

Back Wheels: 12" face. Gauge as above.

Diameter of Wheels: 3' 6½"; steers from the back.

COMMUNICATE

FIBORN LIMESTONE COMPANY
Sales Department
Sault Ste. Marie Ontario, Canada

FOR SALE

1—Porter Locomotive, 9x16", in fair condition.

1—Marion Steam Shovel No. 373, complete with 2½ yard dipper and boom. All parts in excellent condition, new housing and roof.

The above machinery must be sold at once. If you are looking for a bargain, have this machinery inspected.

INDUSTRIAL SERVICE CO.
LINCOLN, N. J.

WANTED 15 or 20 Ton LOCOMOTIVE CRANE

Immediately

Phone—Write—Wire

THE C. A. EDWARDS CO.
4209 Euclid Avenue, Cleveland

GYRATORY CRUSHERS

1 Gates No. 12 3 Number 5 1 Kennedy 10
3 Kennedy 6 3 Austin No. 8 2 McCully 7½

Locomotives, Cars, Cranes, Steam Shovels

J. F. DONAHOO CO., Birmingham, Ala.

LIME KILNS WANTED

Anyone having steel shells for four vertical lime kilns please send full description and price to PRODUCER, care this paper.

Idle Machinery Absorbs Profits

This department is the medium for the men who keep the wheels going. Sell your idle machinery to the man who'll keep it going.

STEAM SHOVELS
LOCOMOTIVES
LOCOMOTIVE CRANES
CARS
RAILS
HOISTING ENGINES
GRAB BUCKETS
CRUSHERS
COMPRESSORS, ETC.

Try us for honest value in dependable "used" material of this character.

WE'LL TREAT YOU RIGHT.

Wm. B. Grimshaw Co.
1048 Drexel Building
PHILADELPHIA, PA.

Dealers in "Used" but "Not Abused" Machinery

I WISH TO PURCHASE

a second hand 9 foot Chaser Mill for the purpose of grinding sand. Please quote price.

H. R. STALLINGS
25 N. Jonathan Street, Hagerstown, Md.

FIRST —Get Bulletin 237—or, wire

ZELNICKER IN ST. LOUIS

before buying or selling

RAILS

LOCOMOTIVES CARS CRANES
Shovels Machinery Piling, Etc.

What have you for sale?

RAILS - RAILS - RAILS

NEW RAILS
16-20-25-40-70-80
RELAYERS
30-35-56-60-65-85

MORRISON & RISMAN
RAIL DEPARTMENT: BUFFALO, N. Y.

Quarry Equipment For Sale

Southern Marble Company, owning equipment in good condition, appraised at $27,000.00 at present market prices, will sell entire equipment reasonably. Includes one 150 H.P. boiler, 2 compressors, receiver, 2 pumps, 12,000 gal. cypress tank, 1 8¼x10 D.D. hoist, 2500 feet new wire rope, steel derrick, 100 foot mast, 95 foot boom complete, good condition, 1 wooden derrick, 1 7x10 D.D. hoist, 2 channelers, 4 rotators, 300 feet galvanized iron guys, 2 jackhammers, 11 tripods, 4 steam drills, 1 quarry bar complete, 3 sets channeler steel, stocks, dies, tools, etc.

Address No. 720, care this paper.

FOR SALE

25 Ingersoll-Rand steam rock drills; all sizes up to 1¾". Reasonable. New York City delivery.

Large assortment of new drill steel: all sizes. Reasonable. New York City delivery.

Boilers and Pumps, Hoists, Traveling Derricks, Rails.

Send me your requirements

S. S. VAN WAGNER
26 Cortlandt Street, New York City, N. Y.

FOR SALE

One Ross-Keller Dry Press Brick Machine
One Victor Repress for stiff mud brick
One Atlas Engine, slide valve, 50 H. P.
One Fairbanks-Morse Oil Engine, 60 H. P.
Two Steel Lime Kilns, 40 feet high
One No. 5 Austin Stone Crusher, Elevator and Screens
One Kritzer Hydrating Plant, complete, 30 tons per day.

Standard Lime & Stone Company
FOND DU LAC, WIS.

RAILS

All sections of new and second-hand, on hand for quick shipment. Also purchase old and abandoned plants for dismantling purposes.

M. K. FRANK, Pittsburgh, Pa.

FOR SALE

Used steam drill and six brand new End Dump Steel Quarry Cars, two yard capacity, equipped to handle from either end or side. Manufactured by Austin Manufacturing Co.

THE SHERMAN NURSERY COMPANY, Charles City, Iowa.

ROCK PRODUCTS

Fills the Bill.

Read It!

Advertise in It!

It Pays!

For better service say "I saw it in ROCK PRODUCTS."

PULVERIZED COAL EQUIPMENT

AERO PULVERIZER CO., 120 BROADWAY, N.Y.

The Fuller Engineering Co.

Designing, Constructing and Operating Engineers

Analytical Chemists

Cement and Hydrated Lime Plants a Specialty

Offices: Allentown National Bank Building
ALLENTOWN, PENNSYLVANIA

Red, Brown, Buff and Black

CHATTANOOGA PAINT CO. STANDARD LOWES PAINT CHATTANOOGA, TENN.

MORTAR COLORS

CHATTANOOGA PAINT CO. MORTAR ECLIPSE COLORS CHATTANOOGA, TENN.

The Strongest and Most Economical on the Market

Our Metallic Paints and Mortar Colors are unsurpassed in strength, fineness, and body, durability, covering power and permanency of color.

Write for samples and quotations

CHATTANOOGA PAINT CO.
CHATTANOOGA, TENNESSEE

CAROLINA PORTLAND CEMENT COMPANY

We are the largest distributors of Portland Cement, Lime Plaster, Fire-brick and General Building Material in the Southern States, and have stocks of Standard Brands at all of the Atlantic and Gulf Seaports, and at our interior mills and warehouses, for prompt and economical distribution to all Southern territory. Write for our delivered prices anywhere.

Also Southern agents for the "Dehydrating" waterproofing material. "Universal," "Acme" and "Electroid" Brands Ready Roofing.

GET OUR PRICES

CHARLESTON, S. C. BIRMINGHAM, ALA.
ATLANTA, GA. NEW ORLEANS, LA.

ANCHOR BRAND COLORS

For Mortar, Cement and Brick—
Brown, Black, Red and Buff
—Strongest and Most Durable

Manufactured by

C. K. WILLIAMS & CO.

Correspondence Solicited EASTON, PA., U. S. A.

HURON PORTLAND CEMENT COMPANY · ALPENA HURON MICH.

Daily Capacity 9,000 Barrels

MORE THAN FIFTEEN YEARS OF SATISFACTION

GREAT WATER AND RAIL FACILITIES BEST SERVE THE ENTIRE MIDDLE WEST
FIVE PLANTS: ALPENA, DETROIT, WYANDOTTE, CLEVELAND AND DULUTH

HURON and WYANDOTTE

EVERY BARREL TESTED AND GUARANTEED
SOLD BY THE BEST DEALERS USED BY THE BEST BUILDERS

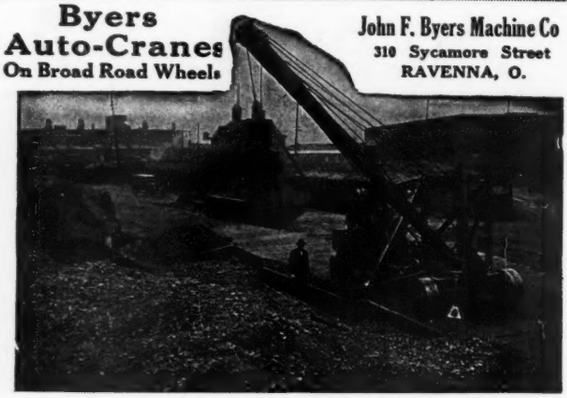
Main Offices: 1525 Ford Building, Detroit, Michigan

WYANDOTTE PORTLAND CEMENT CO. WYANDOTTE, MICH.

Quality, Quantity, Service

To say you saw the ad in ROCK PRODUCTS gives tone to your inquiry.

Byers Auto-Cranes
On Broad Road Wheels



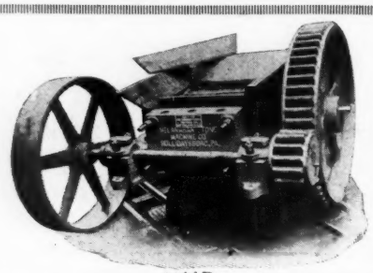
John F. Byers Machine Co
310 Sycamore Street
RAVENNA, O.

American Wire Rope

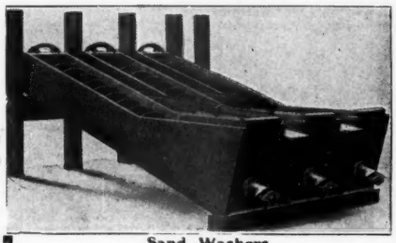
FOR elevators, dredges, lumbering, mining, oil-well drilling, suspension bridges, stump-pulling, cranes, derricks, ships' rigging and every other form of wire rope use.

Ask for illustrated catalogue

American Steel & Wire Company
Chicago, New York, Cleveland, Pittsburgh, Worcester, Denver
Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle



OUR
SINGLE ROLL CRUSHER
Is as Simple as Can Be Is easily fed, makes less fines than either a Gyratory or Jaw. Capacity 5 to 500 tons per hour. For crushing Limestone, Dolomite, Hard Rock Phosphate, Cinders, etc. Screens of all descriptions. Washers for dirty stone.
Ask for information.
McLANAHAN-STONE MACHINE CO., Hollidaysburg, Pa.



Sand Washers

9-Foot Dry Pan

LEWISTOWN FOUNDRY & MACHINE CO.
LEWISTOWN, PA.
Builders of heavy duty crushers and glass sand machinery. Glass sand plants equipped complete. Write for prices and catalog

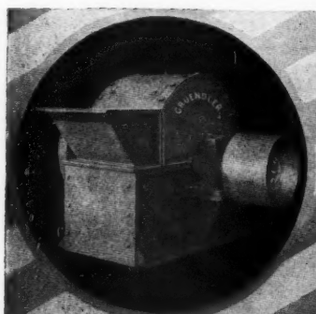
Uniformity

AWC Co.

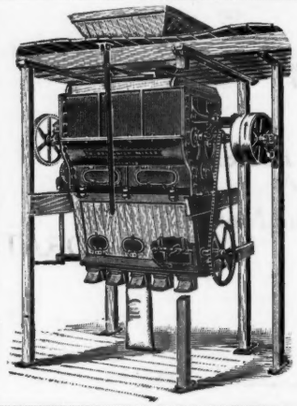
Material of even gauge; meshes of even size—these produce uniform results when you use
AUDUBON WIRE CLOTH
Our catalog—sent on request—shows the different kinds with which we can supply you.
AUDUBON WIRE CLOTH CO.
Factory and Office
AUDUBON
N. J.

Service

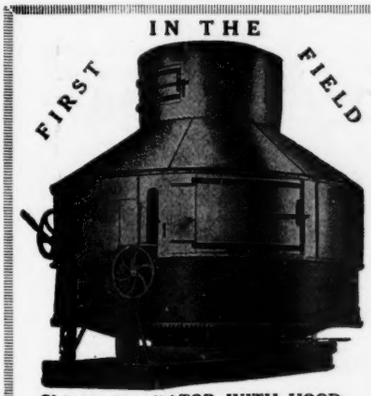
BACON-FARREL
ORE & ROCK
CRUSHING-WORLD KNOWN
ROLLS-CRUSHERS
EARLE C. BACON, INC. ENGINEERS
26 CORTLANDT ST., NEW YORK



GRUENDLER Crushers and Pulverizers
are especially adapted for pulverizing limestone for fertilizing purposes; will increase your profits by increasing your production approximately 30%. The double-ended hammer arrangement is the reason.
Let us explain
Gruendler Patent Crusher and Pulverizer Co.
ST. LOUIS, MISSOURI



THE
"BROUGHTON" MIXER
Is continuous in operation, and will thoroughly mix any dry materials as fast as two men can bag and remove.
Let us tell you more about them
DUNNING & BOSCHERT PRESS CO., Inc.
327 West Water Street
SYRACUSE NEW YORK



CLYDE HYDRATOR WITH HOOD
"The common sense way"

The CLYDE LIME HYDRATOR

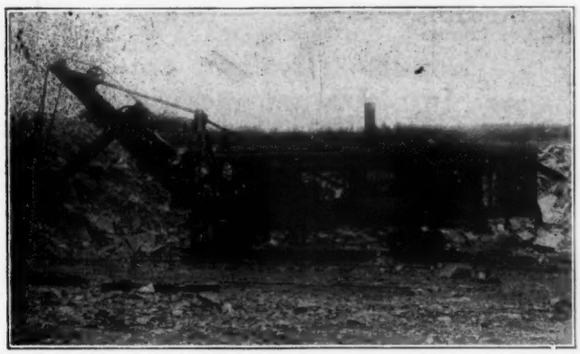
The simplest and easiest to operate. The most economical in Installation, Maintenance and Operation. Makes a **perfect hydrate** of either High Calcium or Dolomite Lime.

Price, per ton capacity, only three-fifths of any other Hydrator on the market.

WRITE FOR CATALOG AND INFORMATION.

H. MISCAMPBELL, Duluth, Minn.

Patentee and Sole Manufacturer.

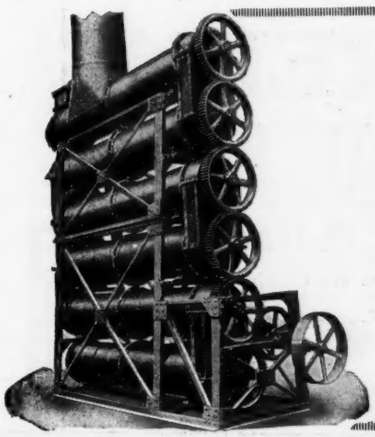

Osgood-73, in Heavy Quarry Work

THE OSGOOD 73—3½ yard steam shovel is designed throughout for the heaviest kind of service. It meets demands where maximum strength is required and severe work to be done, such as found in iron mines, rock works, etc.

It has all the features in good steam shovel construction which embody steel gears with machine cut teeth; manganese racks and pinions for dipper handle; cast steel swinging circle; heavy front end construction; especially strong boom; large boiler and water tanks; long car frame; enclosed firing platform; steam hoisting friction; by-pass throttle, etc.

We will take pleasure in furnishing you on request complete information on any of the different size shovels we build which range from ¾ to 6 cubic yard capacity.

THE OSGOOD COMPANY, Marion, O.



Hydrated Lime

THE KRITZER WAY

Insures a product which has a standard market value. We install plants complete, designed by our own expert engineers to meet local conditions and turn out a uniform grade of Hydrated Lime of the highest standard, and with the greatest economy in cost of production.

THE KRITZER CONTINUOUS HYDRATOR, AND THE ACCESSORIES INSTALLED WITH IT, ARE THE RECOGNIZED STANDARDS IN THIS LINE.

THE KRITZER COMPANY, 72 W. ADAMS ST., **Chicago, Ill.**

If It Is LIME We Make It

(STRONGEST IN OHIO)

Bulk and Barreled : "MASON'S HYDRATE," for Brick-work, plastering and masonry : "LIME FLOUR," Hydrated Finishing Lime, Best on the Market : "CLOVER GROWER," Land restorer, for the farmer : "CARBO HYDRATE," Soil sweetener, crop producer.

PROMPT SHIPMENTS A DEALER WANTED IN EVERY TOWN

Write or Phone for Prices

The Scioto Lime and Stone Company, Delaware, Ohio

The advertiser wants to know that you saw his ad in ROCK PRODUCTS.

To Determine Carbonates
—a New Method

The percentage of carbonates in limestone, fertilizers, baking powders and other materials can be determined ACCURATELY and QUICKLY with the

Barker Carbonate Apparatus

Any **unskilled user** can obtain results by this method that compare favorably with those of a skilled chemist using standard laboratory methods.

Apparatus is a hydrometer containing the sample, to which HCL is added. Decrease in weight accompanying consequent release of CO_2 is recorded on a scale as "percentage of carbonates" from which the gas escaped. No chemical balance required, and no long calculations to be made.

Designed by J. F. Barker, M. S., specialist in soils, Ohio State University, College of Agriculture, who personally tests and certifies each instrument before it is shipped to user.

Write for descriptive circular.

Bausch & Lomb Optical Co.
200 St. Paul St., Rochester, N. Y.
NEW YORK WASHINGTON CHICAGO SAN FRANCISCO
Manufacturers of Microscopes, Projection Apparatus (Balopticons), Photographic Lenses, Precision Glassware and other High Grade Optical and Laboratory Equipment.

Powdered Coal

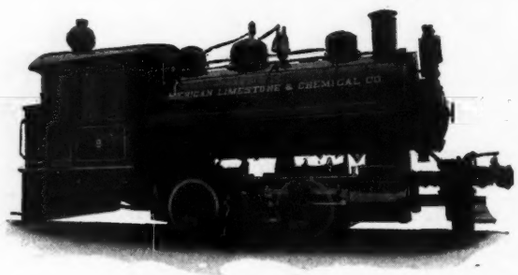
Development of the "Lopulco" System has provided a reliable way of using Pulverized Fuel.

Higher capacities and efficiencies can be obtained with the "Lopulco" System than are possible with older methods of combustion.

"Lopulco" Systems are delivered in operation and under definite guaranties.

Locomotive Pulverized Fuel Co.
Industrial Department
30 Church St., New York
Transportation Building, Montreal

VULCAN



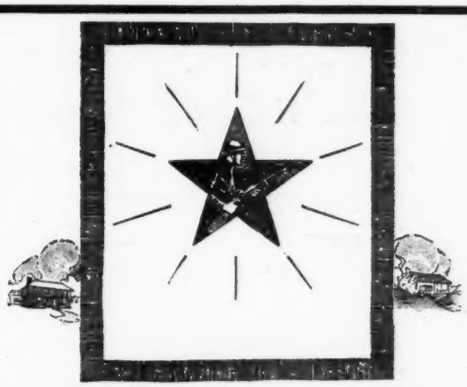
BUILDERS of Locomotives of all gauges and every description adapted for contractors' use, grading new lines of railroad, service in quarries, yard switching, movement of cars and material about industrial plants. Also for longer hauls through sugar cane plantations and lumber tracts.

Particular attention given to individual haulage problems and designs recommended which will give the best results where conformity to special conditions of service is essential

Vulcan Iron Works
Wilkes-Barre, Pa.

SCREENS
of All Kinds

Chicago Perforating Co.
2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.



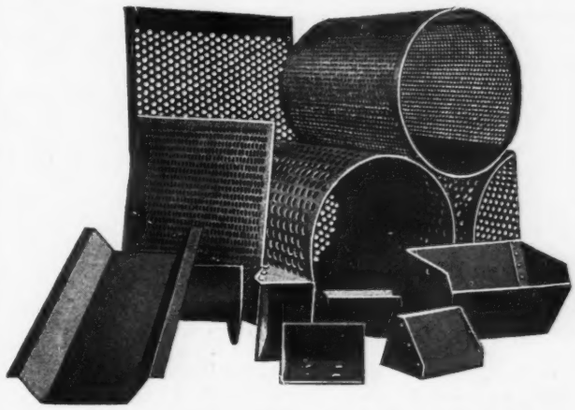
The Service Flag—with its Star of Blue—
Sometimes Turned to Gold:
It matters little where this badge of service hangs;
in the home of wealth or some humble cottage.
Always its message is the same:—
That you shall lend and LEND GENEROUSLY
to end this war more quickly.
Also:
To save more Blue Stars from turning Gold.

THINK

HAVE YOU BOUGHT YOUR LIMIT?
4th LIBERTY LOAN

Weller Mfg. Company **Chicago**

Perforated Metal Screens
FOR
Stone, Gravel, Sand, Etc.



ELEVATOR BUCKETS
PLAIN AND PERFORATED
General Sheet and Light Structural Work

HENDRICK MFG. CO.
CARBONDALE, PA.
New York Office, 30 Church Street

Loaders

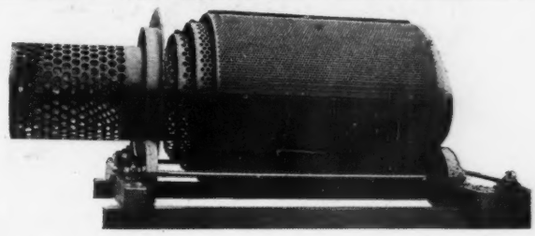
reduce your labor list; increase the efficiency of the few necessary hands; keep your trucks busy and improve your service. *Dealer* or *producer* can use G-W Loaders to advantage.

Be sure you select G-W Loaders. The frames of light steel make them easy to move. The machines are collapsible so that they can be easily wheeled in sheds, etc. Other features explained in our literature.

Write for Catalogue No. 16-R

GIFFORD-WOOD COMPANY
Main Office: HUDSON, N. Y.
New York Buffalo Boston Chicago Philadelphia

STONE SCREEN SECTIONS
CYLINDERS
DUST JACKETS
MADE TO FIT ALL MAKES AND SIZES OF REVOLVING SCREENS

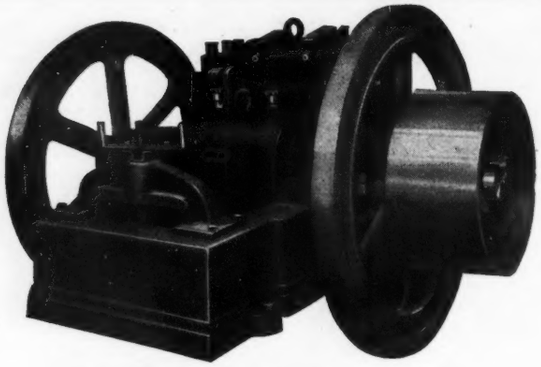


THE O'LAUGHLIN SCREEN (PATENTED)

SAND and GRAVEL SCREENS
CYLINDERS **SCREEN PLATES**
CONICAL SCREENS
EVERYTHING IN SCREENS
QUICK SHIPMENTS

JOHNSTON & CHAPMAN CO., 2921 Carroll Ave. CHICAGO

Tell the advertiser you saw his ad in ROCK PRODUCTS. He'll appreciate it.



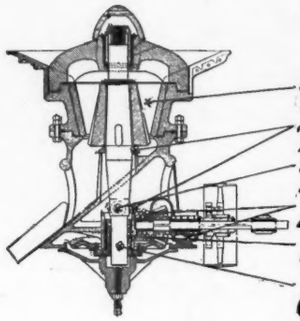
WITH YOU it is a question of *results*. If you can buy the right crusher at the right price to do the right work in the right way, what better can you expect?

Write us for information which will help you

Webb City & Carterville Foundry & Machine Works
WEBB CITY, MO.

Austin Gyratory Crushers

Six Special Advantages



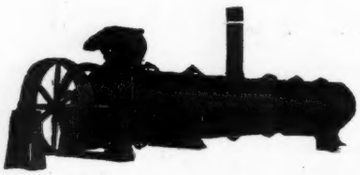
1 After adjusting for wear of head concaves will receive the same sized rock.
2 Upper and lower collars thoroughly protect working parts from dust and grit.
3 Automatic oil-pump and oiling system, insuring thorough lubrication of all bearing surfaces.
4 Countershaft supported on both sides of driving pinion.
5 Rigid eccentric bearing.
6 Full eccentric bearing surface retained when head is raised.

MADE IN EIGHT SIZES
50 to 5000 tons per day

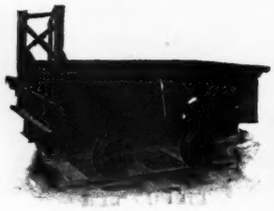
We sell Austin Gyratory Crushers on their mechanical superiority evidenced by the users. Amongst recent purchasers are the United States Government, Australian Government, etc. Austin Crushers have been identified with some of the most important engineering projects, such as the Mississippi Dam, etc.

Present your crushing problems to us for advice and estimate

AUSTIN MFG. CO., Chicago
New York Office: 50 Church St.



Lime Hydrators, Kilns, Calcining and Quarry Cars



No. 274
End Dump Quarry Car.

No. 217-H Rocker Side Dump Car
Also made in end dump. Above car made for loading with Steam Shovel.

Reduce Your Handling Costs by Using

Atlas Cars and Locomotives

Where a trolley wire or third rail is undesirable investigate our storage battery locomotives. Made in several styles and sizes. Cars to suit every requirement.

THE ATLAS CAR & MFG. COMPANY
909 Marquette Road, Dept. 6, CLEVELAND, OHIO

UNIVERSAL CRUSHERS

The biggest value for your money. Universal crushers and pulverizers reduce stone to desired size or fineness in a jiffy!

Fifteen years of designing and building experience have made possible the exceptional ability of Universals.

Universal Crusher Co.
225 Third Street
Cedar Rapids, Iowa, U.S.A.

Ask for Folder 1918

"IT'S a very hard limestone in this quarry, and the ledges are from 14 in. to 4 ft. thick. When the pieces are too big to go into the dipper we put chains on them.

The ERIE is running like a charm. When I am in the market for another shovel it will be an ERIE.''—*C. C. BEAM, Quarryman, Yellow Springs, Ohio.*

The ERIE is THE shovel for rock work. Built far stronger than the usual standard of steam shovel construction.

And besides, it's very speedy. Some quarries have loaded 500 to 600 cu. yds. of rock a day with their ERIES.

We will be glad to send you a bulletin showing just what the ERIE Shovel can do. Write for a copy of Bulletin P. Address:

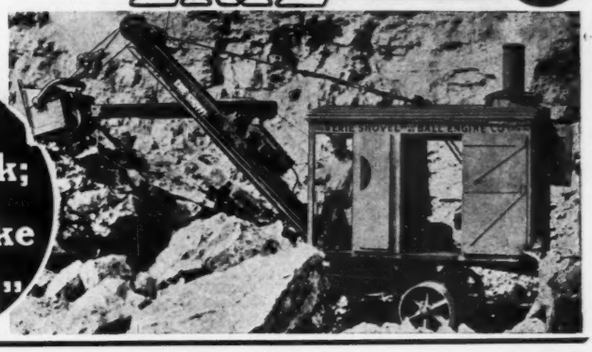
BALL ENGINE CO., Erie, Pa.

Builders of ERIE Shovels and Cranes; BALL Engines

ERIE Revolving Shovels

BALL Engine Co. Erie, Pa.

"Hard rock work; running like a charm!"



CRUSH THE HUN

BY BUYING GENEROUSLY

4th LIBERTY LOAN

U. S. GOVERNMENT BONDS

This space contributed for the winning of the war by

THE WILLIAMS PAT. CRUSHER & PULVERIZER CO.

General Sales Department, 37 West Van Buren Street

CHICAGO

PLANT: ST. LOUIS, MO. 67 Second Street, SAN FRANCISCO

Nippers—17 x 19", 18 x 26", 20 x 30", 24 x 36" and 26 x 42"

JAW & ROTARY CRUSHERS

FOR ALL ROCKS AND ORES SOFTER THAN GRANITE

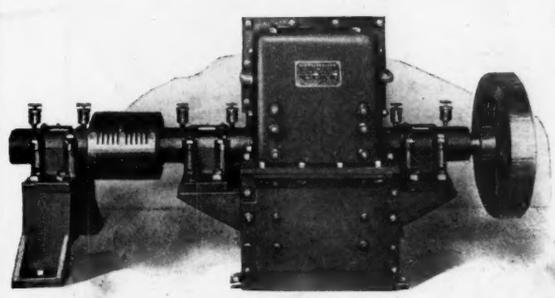
GYPSUM MACHINERY—We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

Special Crusher-Grinders for Lime

Butterworth & Lowe

17 Huron Street, Grand Rapids, Mich.

20 to 47 inside diameter. Many variations



The K-B Pulverizer

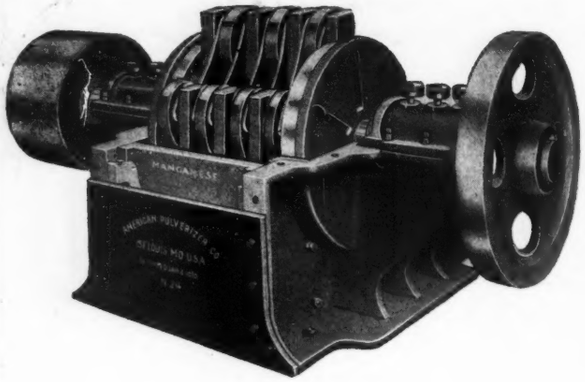
Will crush 3-in. pieces of any moderately hard material to dust in one operation. It is designed to do a large amount of work with a small consumption of power—and does it.

ASK US FOR PROOF

Send for Catalog with full particulars

K-B PULVERIZER COMPANY, Inc. 86 Worth Street NEW YORK

K-B PULVERIZER



Lime-Stone For the Farmer

BUY A GUARANTEED MACHINE

Smallest power consumption.
Our Patented Feeder makes the operation of this machine automatic.

AMERICAN RING PULVERIZER

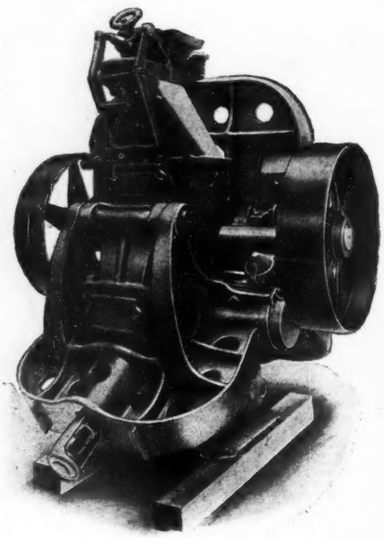
We guarantee exact power consumption, wear and tear, upkeep, etc., according to your proposition

The Patented **American Ring Pulverizer** Is Doing It

Write for prices and plans to the

AMERICAN PULVERIZER CO., CORNER 18th AND AUSTIN ST. **St. Louis, Mo.**

We crush everything ***Why can't you do it?***



MAXECON MILL

Preliminary Grinder for Tube Mills

LIMESTONE .....20 to 40 Mesh
CEMENT CLINKER.....20 to 60 Mesh

MAXECON MILL PERFECTION SEPARATOR

The UNIT that has LARGER OUTPUT with LESS POWER WEAR and ATTENTION than any other.

It will be to the interest of those who operate CEMENT PLANTS to know what the Maxecon Unit will do.

Drop us a line. *We will be glad to tell you about it.*

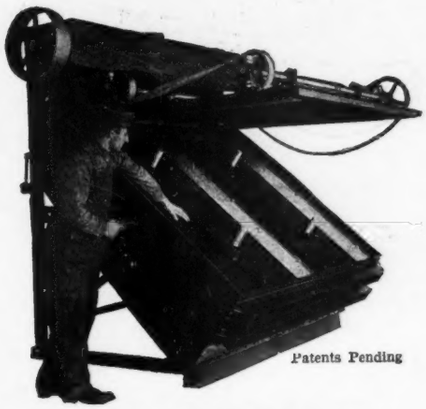
KENT MILL COMPANY

10 Rapelyea Street BROOKLYN, N. Y.

Cooperation is the thing—please mention ROCK PRODUCTS.

WHIP-TAP

Unchecked "Drumhead" Vibration



Patents Pending

WHIP-TAP SEPARATOR

Screens, Limestone, Silica, Gravel, Phosphate Rock, and other Rock Products

It would be impossible to maintain the vibration on a kettle-drum if the drumsticks were allowed to rest on the drumhead after each blow.

So in inclined screening, it is important that no dead weight be permitted to lie on the screening surface to stop the vibration and interfere with the screening action.

In the WHIP-TAP Separator Screen, the hammers which keep the taut screening surface in constant vibration are mounted on resilient springs. The recoil of the hammer spring, immediately the blow is struck, takes the weight of the hammer off the hammer post, permitting the vibratory action to continue unchecked between taps.

WHIP-TAP unchecked "drumhead" vibration on the taut screening surface produces a greater volume of closely-sized material than any other screen made.

Write for Catalogue

THE W. S. TYLER COMPANY

Manufacturers of TYLER "Double Crimped" Wire Cloth and Ton-Cap Screen **CLEVELAND, OHIO**

A Thousand Tons of Marl Daily With This PLYMOUTH Locomotive

UP at St. Mary's, Ontario, the firm of St. Mary's Cement, Limited, has several problems rolled into one—and PLYMOUTH Gasoline Locomotives are helping straighten them all out.

First, there's a big volume of material to be dug and handled; then it has to be delivered at the clay storage, which means a pull up a five per cent. grade from the pit.

This PLYMOUTH is handling a thousand tons of marl or clay every 10 hours; moving a two-car train with ease up the five per cent. grade, and meeting the Company's expectations in every way.

The Customer's Testimonial—"Send Us Another PLYMOUTH Locomotive"

The business grew beyond the Company's existing facilities, so they enlarged—a part of the new equipment being another Locomotive like the first one.

A PLYMOUTH Gasoline Locomotive will help *you* to counter rising costs and meet the labor shortage, both at one stroke. It will put your business on a real efficiency basis and will help prepare you to handle the rush seasons as they arrive.

Write Us Now for Interesting Particulars About the PLYMOUTH

—what it has done for American industry in nearly every kind of hauling. Important facts for you, your Superintendents, and everyone concerned with your hauling questions.

No obligation—write us now.

THE J. D. FATE COMPANY, *210 Riggs Avenue,* PLYMOUTH, OHIO

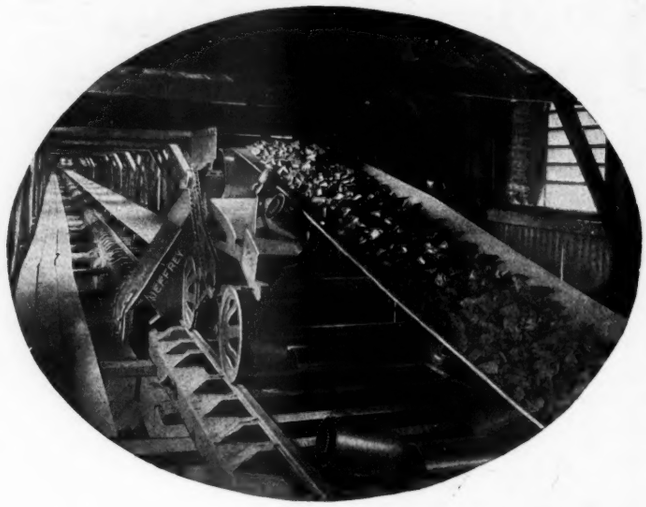
Sales Representatives in all Principal Districts

16

Economy Features of

JEFFREY RUBBER BELT CONVEYERS

1. *Large Capacity*
2. *Handle Heavy Materials*
3. *Speedy and Silent*
4. *Operate on Minimum Power*
5. *Involve Minimum Upkeep*
6. *Give Long Service*



Jeffrey "Century" Belts are standing the severe service of conveying Rock, Ores, Stone, Sand, Gravel, Coal, Coke and other heavy materials.

The various types of Jeffrey Trippers for automatically distributing over a given space or discharging materials at any fixed point are so designed as to occupy minimum space above the belt; operate with minimum horsepower and insure a minimum of care and upkeep.

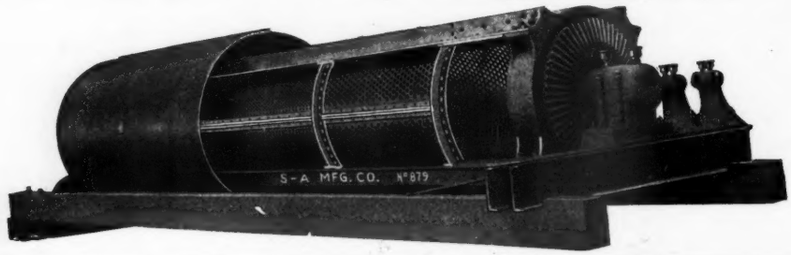
Our New Belt Conveyer Catalog No. 175-A

picturing many applications and giving full details is just off the press.

Send for your copy.

THE JEFFREY MANUFACTURING COMPANY, Columbus, Ohio

New York Boston Philadelphia Pittsburgh Chicago St. Louis Birmingham Dallas Milwaukee Seattle Denver Montreal Cleveland



S-A Revolving Screens

come in a variety of sizes and styles—one suited for each need. The No. 9 Screen, shown above, is one of largest and heaviest manufactured. It is built to meet the requirements of plants where large capacity results in severe service and the necessity for rugged equipment.

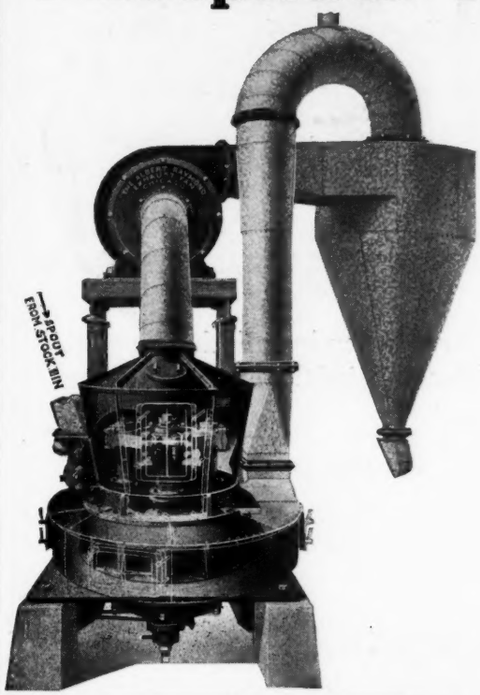
The S-A No. 9 Screen is formed of cast iron ends securely connected by heavy, angle-bar irons to which the screen plates are bolted. This eliminates the use of spiders or any internal obstructions. Other good features are explained in our catalog.

We design and manufacture conveying machinery for rock crushing plants, gravel washing plants, storage systems and other purposes, as well as transmission and screening equipment, elevators, gates, feeders, car pullers and other specialties. Just tell us your need.

STEPHENS-ADAMSON MFG. CO.

AURORA, ILLINOIS

Coal—Limestone—Hydrated Lime
Phosphate Rock—Clay—Gypsum



Any one grinding these materials or similar ones should investigate the advantages and economies produced by the

Raymond PULVERIZING Air-Separating System

which is used as a standard for the grinding of these materials in more than 150 plants throughout the country.

The results obtained by the Raymond System have proved that this system of fine grinding is the most desirable and economical.

The Raymond System is a complete unit in itself, and it takes the raw material direct from the storage bins, pulverizes it and delivers the finished product to sackers or next point in process of manufacture.

No screens, conveyors or elevators are necessary, as the material is air-bolted to obtain the required fineness and the same air carries the finished product to the storage bins.

And the whole operation is **Absolutely Dustless.**

The extent of the economies produced by this method in many plants is astonishing. It cuts down that big item of expense, **Repair Cost.**

What is it worth to you to cut down the grinding cost in your plant?

Raymond System will do it, let us prove it. Send for our Book.

RAYMOND BROS. IMPACT PULVERIZER COMPANY
1301 North Branch Street **CHICAGO, ILL.**

Avoid Crusher Troubles

The Superior-McCully Gyratory Crusher has features that you will find in no other standard type of gyratory crusher. Its new improvements will end your crusher troubles. Designed to overcome the faults usually found in gyratories, this machine from the start has enjoyed remarkable success. Over 100 now in use.

SUPERIOR McCULLY GYRATORY CRUSHER

PATENTED

Life of "Eccentric and Gears" are lengthened 200% because all dust and grit are absolutely excluded and Cut Gears run quietly in oil. Main shaft is 60% stronger than Standard Gyratories of corresponding opening. Area of eccentric 100% greater than any other machine of equal size.

Capacities—30 to 1,000 tons per hour, built in sizes from 10 in. to 54 in opening.

Recent orders received for Superior McCully Gyratory Crushers from prominent Lime and Cement manufacturers.

Lehigh Portland Cement Co., International Portland Cement Co., Cuban Portland Cement Co., Standard Lime & Stone Co., Rock Cut Stone Co., Lehigh Stone Co.

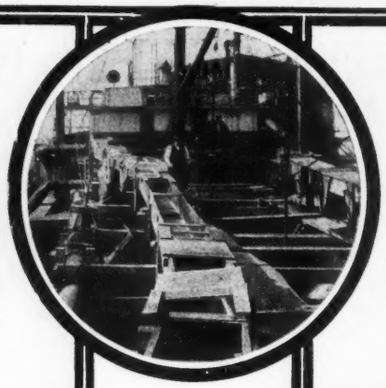
Let us tell you how we overcome common crusher troubles

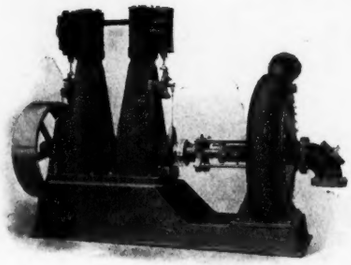
Ask for Bulletin

WORTHINGTON PUMP AND MACHINERY CORPORATION

New York Office, 115 Broadway **Power & Mining Machinery Works, Cudahy, Wis.**
Chicago Office, 820 Old Colony Building
Branch Offices in all Principal Cities

M674



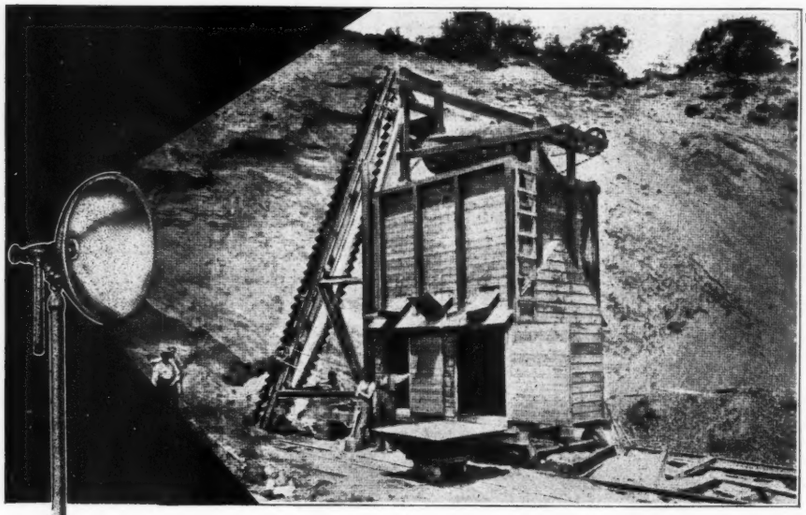


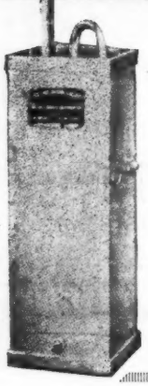
THERE'S a boat at South Chicago, on which an Erie pump is installed. It "sucks the sand from the sea" or more properly speaking, from the bottom of Lake Michigan. It fills the hoppers and then discharges that sand on land—quicker, in much greater volume, and at a less price per ton, than can be accomplished in any other way.

Boats with Erie Pump installation handle the sand with *one-third* the labor required by any other system.

If you have a problem which can be solved by taking sand from the water, let us send full details of our proposition.

ERIE PUMP AND ENGINE WORKS
MEDINA, NEW YORK





Turn Night Into Day

by using a

NEW MILBURN
Portable Carbide Light

The kind that burns ordinary carbide that's sold everywhere.

Mines equipped with New Milburns are inde pendent of dark days—independent even of nightfall—for the wonderful New Milburn L ights, with capacity up to 25,000 candle power, give a powerful illumination that turns night into day.

They cost from 1c. to 4c. an hour, depending on candle power.

They operate absolutely automatically and require no attention.

They don't overgenerate—and you CAN'T overcharge them.

They require only water and ordinary carbide, sold everywhere.

Circular 236 tells more about them!

THE ALEXANDER MILBURN CO., Baltimore, U. S. A.
Manufacturers of Portable Carbide L ights and Oxy-Acetylene Apparatus

Wash the waste rock! Get the mud out! Screen it! When you realize the useful material that is lying idle and useless in the tailings and screenings from your *limestone quarries,* you will resolve that it is not only a patriotic duty, but a profitable performance, to turn this great pile of waste material into a useful product —*agricultural lime*—for the benefit of the land, the glory of Uncle Sam—and your own advantage.

DULL

washing screens are of paramount importance. They accomplish results where many make a bad bluff at it. Wash and screen your limestone waste with greatest economy.

GET THE LIMESTONE OUT OF YOUR WASTE PILES— LET US SHOW YOU HOW

THE RAYMOND W. DULL CO.
1914 CONWAY BUILDING CHICAGO

BRADLEY

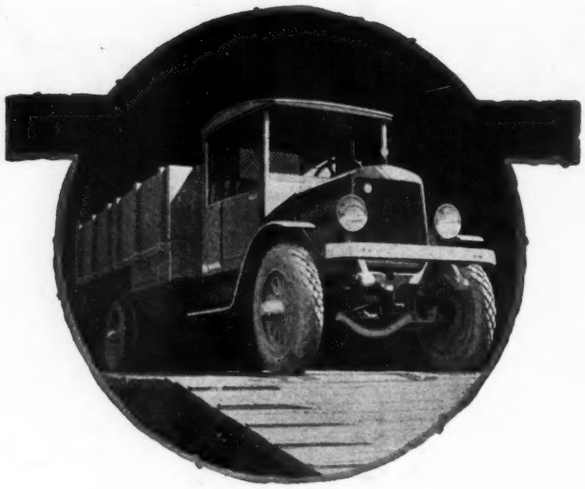
THREE ROLL MILL

YOUR best opportunity to increase the products of the land by providing agricultural limestone is obtained by installing the BRADLEY THREE-ROLL MILL, which produces a perfect limestone powder **most economically.** It takes ¾ inch material (or smaller) and reduces it to a uniform, finely ground material in one operation. This result is accomplished at a **lower price** than is obtained by many mills which turn out **coarser** material.

We will send full particulars and prices. Our engineers are at your service. Engineering of Agricultural Limestone Plants a Specialty

BRADLEY PULVERIZER CO.
BOSTON LONDON, ENGLAND
Works: ALLENTOWN, PA.

The advertiser wants to know that you saw his ad in ROCK PRODUCTS.



Never before has the need of dependability and adaptability in motor trucks been so apparent in the rock products industry as today.

KISSEL, realizing this, has incorporated in the vital structural parts of Kissel Trucks those engineering principles and construction features which ten years of motor truck designing and constructing experience have proven to produce unlimited power, ability for continuous service and low operating cost and upkeep.

The ALL-YEAR Cab, an exclusive Kissel Truck feature, insures uninterrupted performance, no matter how severe the weather may be. *In summer, it is an open, cool cab; in winter, it is completely enclosed, increasing the driver's efficiency, by giving him complete protection.*

There is the right size truck for your requirements. See your nearest Kissel Dealer, who has specifications, prices, etc. See him without delay.

KISSEL MOTOR CAR CO., Hartford, Wis., U. S. A.

KISSEL TRUCKS

Classified Business Directory

BAGS AND BAG MACHINERY
Jaite Company, The
Urschel-Bates Valve Bag Co.

BIN GATES
Beaumont Co., R. H.

CARBIDE LIGHTS
Alexander Milburn Co., The

CALCINING MACHINERY
Atlas Car & Mfg. Co.
Butterworth & Lowe

CEMENT, PORTLAND
Alpha Port. Cement Co.
Carolina Portland Cement Co.
Huron Wyandotte Portland Cement Co.

CHAINS AND TRANSMITTING MACHINERY
Stephens-Adamson Mfg. Co.

CONVEYORS AND ELEVATORS
Caldwell, H. W., & Son Co.
Jeffrey Mfg. Co., The
Webster Mfg. Company
Gifford-Wood Co.
Stephens-Adamson Mfg. Co.
Weller Mfg. Co.

CRANES
Locomotive Gantry
Ball Engine Co.
Byers Mach. Co., John F.
McMyler-Interstate Co.

CRUSHERS AND PULVERIZERS
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Austin Mfg. Co.
Bacon, Earle C.
Bradley Pulverizer Co.
Butterworth & Lowe
Chalmers & Williams
Gruendler Pat. Crusher & Pulverizer Co.
Jeffrey Mfg. Co.
K. B. Pulverizer Co.
Kent Mill Co.
Lewistown Foundry & Machine Co.
McLanahan-Stone Machine Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulverizer Co.
Stroh Steel Hardening Process Co.
Traylor Eng. & Mfg. Co.
Universal Crusher Co.
Webb City & Carterville F. & M. Works.
Williams Pat. Crusher & Pulverizer Co.
Worthington Pump & Mach. Corp.

DRILLS
Sanderson Cyclone Drill Co.
Sullivan Mach. Co.

DRYERS
Ruggles-Coles Eng. Co.

ENGINEERS
Bacon, Earle C., Inc.
Fuller Engineering Co.
Smidth & Co., F. L.
Schaffer Eng. & Equip. Co.

EXCAVATORS
Ball Engine Co.
Dull, Raymond W., Co.

FUSES
Ensign-Bickford Co.

GEARS
Caldwell, H. W., & Son Co.

GYPSUM-PLASTER
Best Bros. Keene's Cement Co.
Wheeling Wall Plaster Co.

HYDRATING MACHINERY
Kritzer Co., The
Miscampbell, H.
Schaffer Eng. & Equip. Co.

INDUSTRIAL CARS
Watt Mining Car Wheel Co.

LIME, HYDRATED
Scioto Lime & Stone Co.
Woodville Lime Products Co.

LABORATORY EQUIPMENT
Bausch & Lomb Optical Co.

LIME KILNS
Steacy-Schmidt Mfg. Co.
Vulcan Iron Works

LOADERS AND UNLOADERS
Gifford-Wood Co.
Jeffrey Mfg. Co.
Stephens-Adamson Mfg. Co.
Weller Mfg. Co.

LOCOMOTIVES
Fate Co., J. D.
Jeffrey Mfg. Co., The

MORTAR COLORS
Chattanooga Paint Co.

MOTORS, ELECTRIC
Gifford-Wood Co.

MOTOR TRUCKS
Federal Motor Truck Co.
Kissel Motor Car Co.
Pierce-Arrow Motor Car Co.
Sterling Motor Truck Co.
White Company, The

OIL ENGINES
Power Mfg. Co.

PAINT AND COATINGS
Chattanooga Paint Co.
Williams, C. K., & Co.

PERFORATED METALS
Chicago Perforating Co.
Hendrick Mfg. Co
Nortmann-Duffke Fdy. Co.
Johnston & Chapman Co.

PLASTER MACHINERY
Butterworth & Lowe
Dunning & Boschert Press Co.

POWER TRANSMITTING MACHINERY
Caldwell, H. W., & Son Co.
Weller Mfg. Co.

POWDER
Atlas Powder Co.
Du Pont de Nemours Co., E. I.
Grasselli Powder Co.

PULVERIZED FUEL EQUIP.
Aero Pulv. Co.
Locomotive Pulv. Fuel Co.

SAND PUMPS
Erie Pump & Engine Works.

SEPARATORS
The W. S. Tyler Co.

SCREENS
Dull, Raymond W., Co.
Gifford-Wood Co.
Johnston & Chapman Co.
Stephens-Adamson Mfg. Co.
Sturtevant Mill Co.
The W. S. Tyler Co.

SHOVELS
Steam and Electric
Ball Engine Co.
The Osgood Co.

STEEL PROCESS
Stroh Steel Hardening Process Co.

TESTING SIEVES AND TESTING SIEVE SHAKERS
The W. S. Tyler Co.

WIRE ROPE
American Steel & Wire Co.
Leschen, A., & Sons Co.

WIRE CLOTH
Audubon Wire Cloth Co.
The W. S. Tyler Co.

Wherever Fuse is Used

whether it be for the great record-breaking 180,000 ton blast made early this Spring by the Bethlehem Mines Corporation, or for the every day affairs,

CORDEAU-BICKFORD FUSE

becomes the choice for efficient, sure results. It adds 10 to 20 per cent to the efficiency of explosions—can be set for discharge at one time, in groups or seriatim.

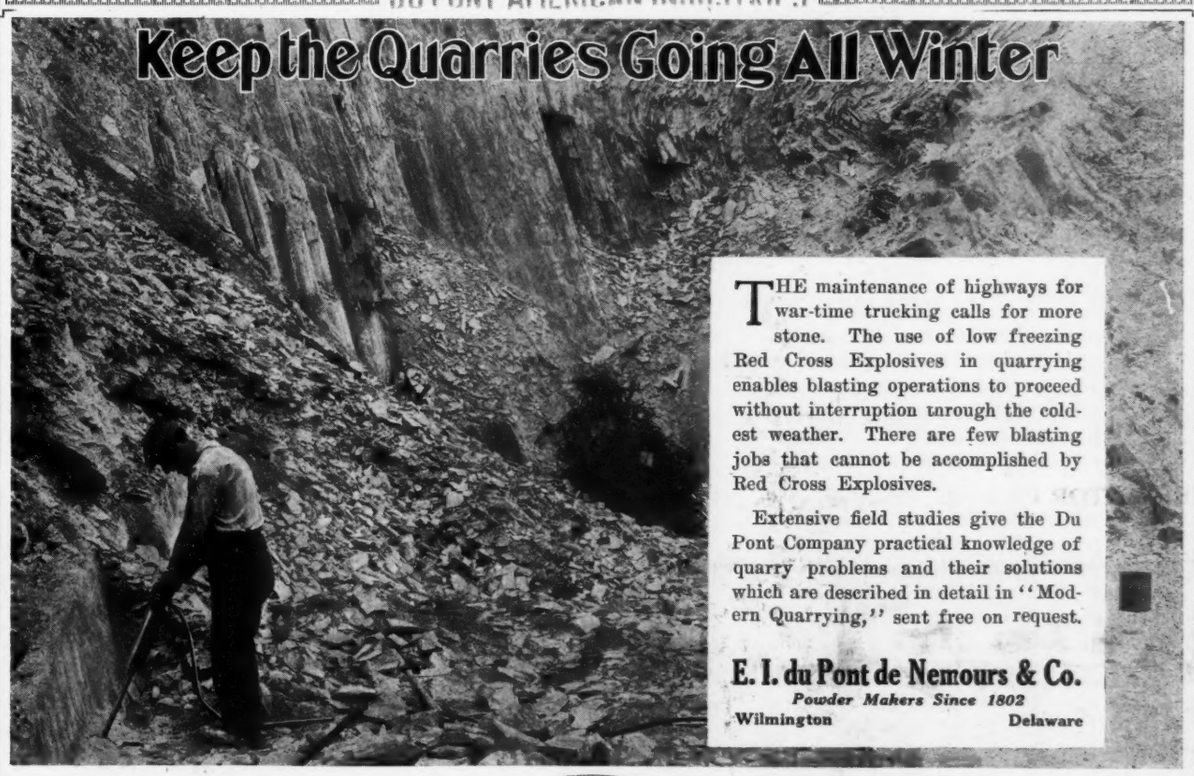
Not sensative to shock or friction—it's safe

THE ENSIGN-BICKFORD CO.
SIMSBURY, CONN.

The Original manufacturers of Safety Fuse

ESTABLISHED 1836

DU PONT AMERICAN INDUSTRIES



THE maintenance of highways for war-time trucking calls for more stone. The use of low freezing Red Cross Explosives in quarrying enables blasting operations to proceed without interruption through the coldest weather. There are few blasting jobs that cannot be accomplished by Red Cross Explosives.

Extensive field studies give the Du Pont Company practical knowledge of quarry problems and their solutions which are described in detail in "Modern Quarrying," sent free on request.

E. I. du Pont de Nemours & Co.
Powder Makers Since 1802
Wilmington Delaware

DU PONT

To Know It Is to Buy It

Schaffer Hydrators are surpassing all expectations in the way of results.

They are producing the highest grade of hydrate from rock heretofore considered inferior.

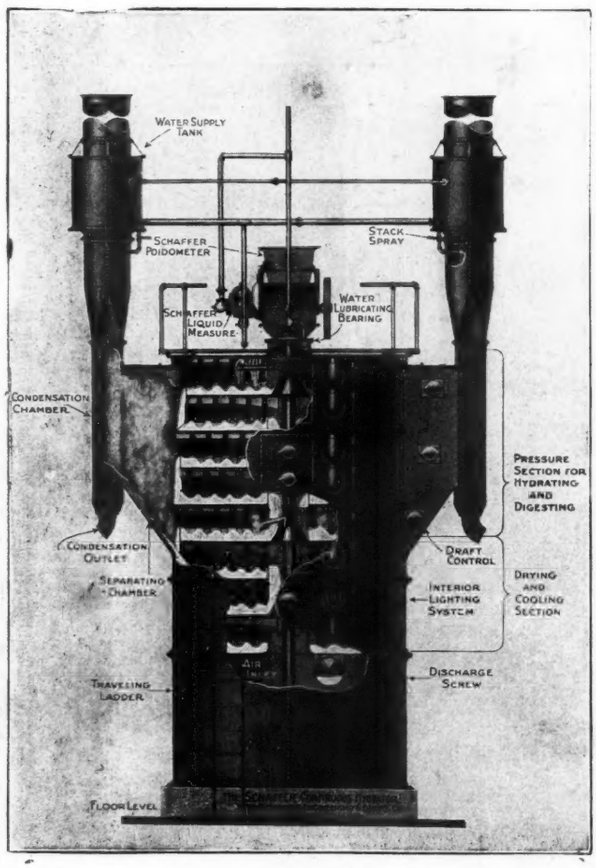
The flexibility of

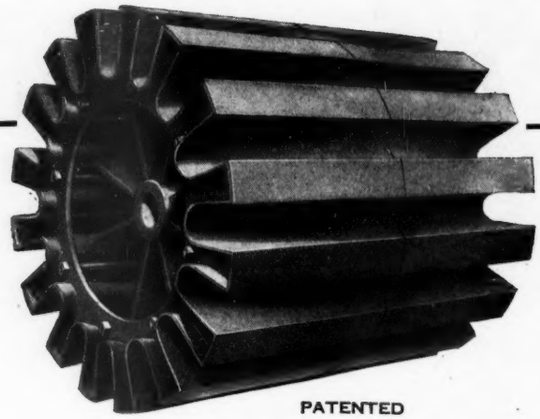
Schaffer
Continuous Lime Hydrators

permit of an adjustment to suit the peculiarities of different lime rock.

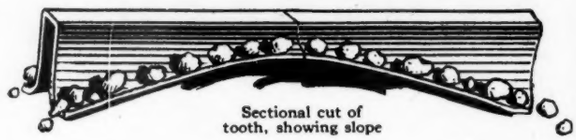
They are automatic and continuous and require practically no labor to operate.

The Schaffer Engineering and Equipment Company
TIFFIN
OHIO





PATENTED



Sectional cut of tooth, showing slope

This device is that little ounce of prevention that saves many a pound of cure!

Where the ordinary pulley is used, elevator belts wear out rapidly, due to the cutting and bruising action of stones which get between the belt and the boot-pulley. The result is much expense and loss of time caused by shut-downs due to the replacing of elevator belts in crushing plants.

The "BLACK" Boot-Pulley
For Elevator Belts

Solves this problem as it is constructed with longitudinal sloping grooves so that

No Stones or Hard Objects Can Damage Belting

The sloping construction of the grooves results in the immediate ejection of any hard material falling between the belt and pulley.

Let us send you descriptive circular

Other Products We Manufacture for Crushing Plants
CRUSHERS, ELEVATORS, SCREENS, HOISTS, ETC.

Allis-Chalmers Manufacturing Company
Milwaukee, Wis.

STROH STEEL

"WEARS THREE to TEN TIMES AS LONG"

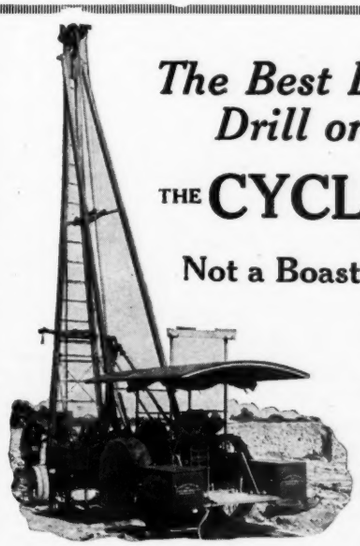
PATRIOTISM means more than going to war—more than buying Liberty Bonds. It is sound sense to make two blades of grass grow where one grew previously. It is sound sense to economize, both in essentials and non-essentials. It is sound sense to SPEND a few dollars to SAVE a thousand. And all this "sound sense" is also PATRIOTISM. The Stroh Steel-Hardening Process, at a comparatively small expense, insures the hardness, strength and toughness of that part of your machinery subject to wear. It lengthens the life of such machinery. Multiply the average length of durability by three, five or ten and get the result. And write us for full information.

STROH STEEL-HARDENING PROCESS CO.
PITTSBURGH, PA.
F. LLOYD MARK, Monadnock Building, Chicago, Western Representative
Hickock & Hickock, Portland, Ore., and San Francisco, Cal., Coast Representatives

The Best Blast-Hole Drill on Earth

THE **CYCLONE** No. 14

Not a Boast—A FACT



We will prove the superiority of the No. 14 Drill by placing one of the outfits in your quarry against any or all other makes.

If the Cyclone doesn't out-drill and out-wear all other drills, we will remove it from the work without cost to you.

Our proposition gets below the paint—it eliminates talking points and evaporates hot air. It puts buying on a strictly engineering basis where it belongs.

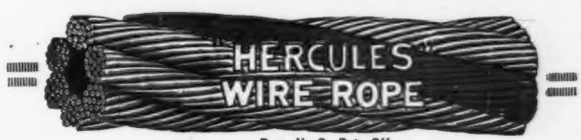
Furnished in Steam, Gasoline, Compressed Air or Electric Power Traction or Non-Traction

Let us send you full particulars

THE SANDERSON-CYCLONE DRILL CO.
ORRVILLE, OHIO
Eastern and Export Office, 50 Church Street, New York

Hercules (Red-Strand) Wire Rope

Back of every HERCULES (Red Strand) Wire Rope is a large modern factory, directed by experienced engineering and manufacturing departments, and operated by skilled workmen.



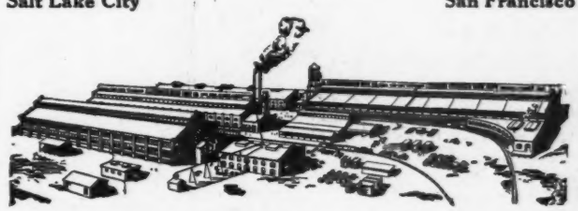
Reg. U. S. Pat. Off.

We make a study of Wire Rope working conditions, and are at all times glad to confer with you regarding your problems along this line.

WRITE US

A. Leschen & Sons Rope Co.
St. Louis, U. S. A.

New York **Chicago** **Denver**
Salt Lake City **San Francisco**



Saying "I saw it in ROCK PRODUCTS" will bring quick action.

UNCLE SAM'S TEST of HYDRATED LIMES

FAK/CE.

DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
WASHINGTON

ADDRESS REPLY TO
BUREAU OF STANDARDS
40TH AND BUTLER STS.
PITTSBURGH, PA.

Pittsburgh Branch

July 19th, 1918.

Woodville Lime Products Co.,
Nicholas Building,
Toledo, Ohio.

Gentlemen:

On April 24th we reported to you results of tests made upon a sample of White Enamel Hydrated Lime received April 10th. The mortars described in this report have been tested for compressive and tensile strength after storing in air for 90 days with the results given below:

	Proportions by Weight	Strength Pounds per Sq. In. Compressive	Tensile
✓ White Enamel:	1:3	463	112
✓ " "	1:4	267	76
✓ " "	1:5	250	74
Ave. High Magnesian	1:3	324	67
Ave. High Calcium	1:3	244	49

White Enamel Mortars were remarkably strong. In every case they are the strongest of the mortars made from any of the 54 hydrated limes so far tested.

This completes the tests to be made upon this sample.

Thanking you again for your co-operation in this matter, we remain

Yours very truly,

A T Bleininger
For the Director.
FAK

THE WOODVILLE LIME PRODUCTS Co
TOLEDO ··· OHIO.